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IMPROVED METAL BAR CUTTER.

A perspective view is given in the annexed cut of a light and compact machine for cutting off iron bars, which would seem to be indispensable in every establishment where heavy iron-work is done.

It consists of a cast-steel tool, A, with a cutting-edge 3-16 of an inch in thickness, which is forced through the iron bar by the lever, L, cutting off a shaving at each stroke. The tool runs through a slide to which a vertical motion is given by the screw, S, the screw being turned by the ratchet-wheel, W. As the main lever is drawn back, a projection from the lower end of it beneath the fulcrum presses against one end of a short lever, pushing it forward and drawing the other end of the short lever backward, thus working a rod which is attached to the further end of the short lever, and which, by a hook at its end, turns the ratchet-wheel, and thus feeds down the cutting-tool, the rod being drawn forward by a spiral spring. The amount of the feed is adjusted by means of a vertical rod which has a crank at each end, the lower crank pressing against the rod and thus allowing a greater or less hold upon the ratchet-wheel in proportion as it is turned by means of the upper crank, C.

A machine weighing 120 pounds will cut off a bar four inches square, of course leaving the ends perfectly square and smooth. One man does the whole work without the aid of any striker, in about half the time required to heat the bar, and about an inch of the iron is saved.

We have seen this machine in operation, and for the small amount of power required to operate it, we think it the best machine for the purpose.

The patent for this invention was granted to Daniel R. Knowles, of Center Groton, Conn., Sept. 21, 1858, and the machines are made by Cresson & Hubbard, of Philadelphia, Pa., to whom inquiries for further information may be addressed.

KNOWLES' METAL BAR CUTTER.

AMERICAN CENTER-BOARD CLIPPERS.

Now that our navy is becoming an object of such solicitude and anxiety, may we not sometimes borrow a leaf from our neighbors, and not always jog along in routine? The *Cork Examiner* states that the center-board clippers from the great American lakes have invariably beat all vessels on their passages from the St. Lawrence, and that one of them, the *D. C. Pierce*, made the Fasque Lights in Ireland, in seven days and sixteen hours from the Straits of Belle Isle, being, for a sailing-ship, one of the fastest passages on record. As our readers may not know what kind of craft they are, we give the following description, telling them that the Welland Canal, through which they pass from the Upper Lakes, avoiding the falls of Niagara, to Lake Ontario and the St. Lawrence, will not admit vessels over 150 feet long, 26½ feet beam, or 9½ feet draft; consequently, their sailing qualities and carrying capacities are regulated by it. Most of them are fore-and-aft schooners without square sails, from 140 to 145 feet long, 26 feet beam, and about 12 feet hold, drawing, loaded with 400 tuns, 9½ feet, or with 200 tuns, about 7 feet, being very fine fore-and-aft. When under goose wings, their speed must be very great, as the booms give a spread of 120 feet of canvas, surpassing that of 1,500 tun clippers. Their lower masts are 90 to 100 feet, top masts 55 to 65 feet; so that their hight of canvas will be from 120 to 130 feet, the sails differing from ours in being laced to the booms, making them stand much better. When on a wind they use the center-board, which can be reefed to draw, 12, 14, 16, 18, or 20 feet of water, which enables them to go within four points. Our readers must, therefore, see the very great utility these vessels, with their sailing qualities and light draft of water, would have been to us during the Russian war, as they could have gone north of Cronstadt with stores and troops right up to St. Petersburg, as they did in the Mexican war up the Matamoras and other rivers, bringing the Americans into the interior; but they were not used by our Admirality, probably not knowing that such vessels were in existence. We should like to know their comparative cost with our gunboats. At the close of the Russian war 160 of these were built, 80 of which are useless, having been hauled up at Devonport, at the cost of £1,000 each, and much damaged thereby, as they ought to have been always afloat. Now, as these center-board vessels, though much larger, did not cost one-third of our gunboats, the Admirality should have made a trial of them, as they would beat the gunboats on any ocean voyage. If fitted with 20-horse power engines for river navigation, they would be found superior for all purposes. We have never seen the cost of 160 gunboats, but should estimate them at the usual expense of our dockyards, as over £3, 000,000, a vast sum, when we consider that one half of them are laid up useless and injured.—*London News.*

A NEW TOBACCO.—The German smokers are, it appears, in an extacy of delight in consequence of a report that Professor Liebig has discovered a mode of imparting to ordinary tobacco the perfume and flavor of the finest Havana. It is said that the most experienced connoisseurs have been put to the test, and have smoked the prepared tobacco, and have believed it was the finest Cuban. Our facetious cotemporary, *Punch*, suggests that the syllables in the name of the discoverer are misplaced, and that instead of *Lie-big*, we should read *Big-lie*.

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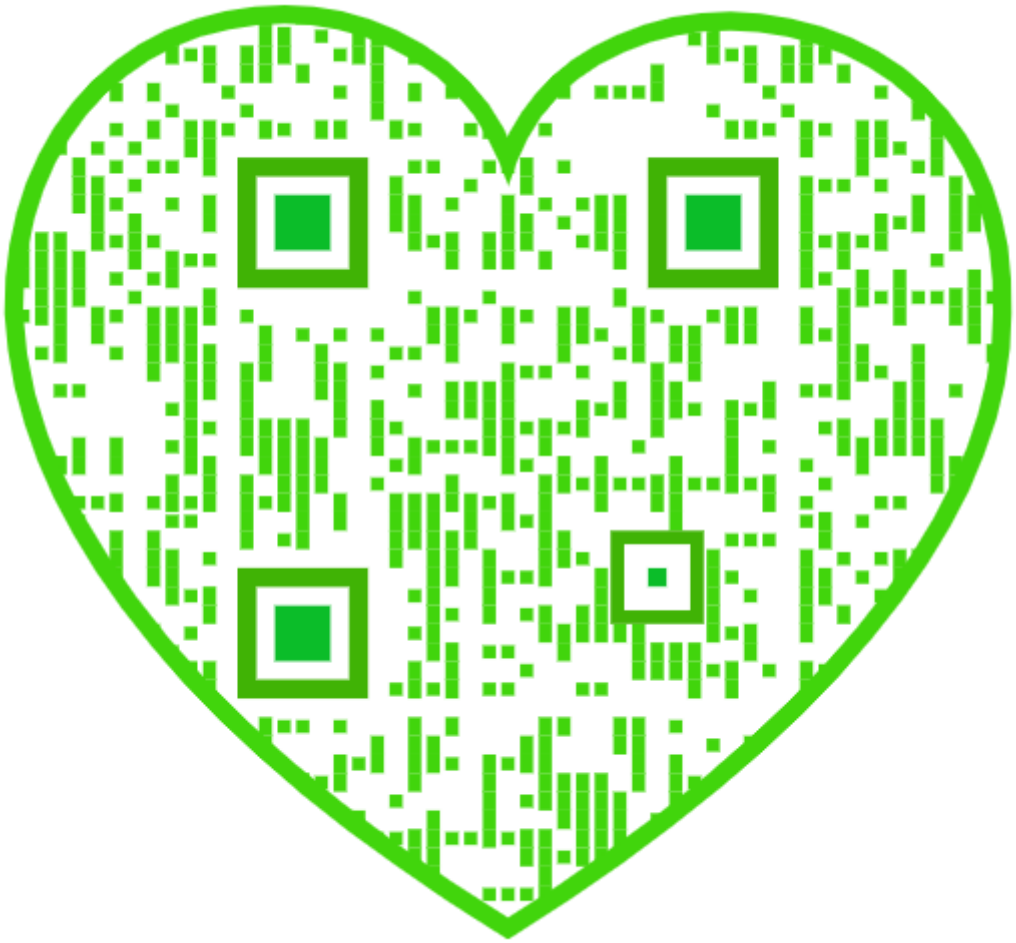

THE MANUFACTURES OF PATERSON, N. J.

SUBSEQUENT OPERATIONS—THE SOCIETY RE-ANIMATED—THE LATE ROSWELL L. COLT—WAR OF 1812—EFFECTS OF THE PEACE—REVULSIONS OF 1837 AND 1857—MACHINE AND LOCOMOTIVE BUILDING

[Continued from page 282.]

A dark age, nearly seven years in duration, followed the suspension of 1796. The society's factory remained most of the time idle, though offered for sale or to lease, until 1802, when part of it was rented by John Parke for spinning candle-wick. Shortly afterwards, John Clarke, Senr., one of the society's former employees, undertook the manufacture of machinery in another apartment, finally leasing the whole building. In his hands it remained until the summer of 1807, when it was burned down, whether from incendiarism or the spontaneous combustion of cotton is unknown. The sum of $6,000, as insurance, was all that remained to the society. For several years afterwards they appear to have had no meetings, members living far apart and believing that "all was lost except their honor." Judge Boudinot, continued to act as governor, while local affairs were managed by agents. In accordance with a resolution to lease as many sites as possible, in 1802, one was made out to Kinsey, Crane & Co., for part of the premises now occupied by the Essex (cotton) factory, as a paper mill. By the way, this is probably the oldest building of the kind in New Jersey, having been opened in 1804. Other enterprises were talked of; and in 1807, the lowest canal was constructed, the other having previously been extended and improved. During the next four years three or four cotton and woolen mills, together with one machine-shop, were put in operation, which will be noticed more particularly under the respective heads of Paterson industry.

The declaration of war against England gave an astonishing impetus to manufacturing enterprise. On a sudden, cotton and machine factories found themselves full of orders at remunerative prices, while the village increased rapidly in extent and population. In 1815, it contained one card and wire factory, one rolling-mill, one saw-mill and eleven cotton mills, with as large a population, says Judge Dickerson, as could possibly be crowded into 74 dwelling-houses—probably not far from 1,500. Meantime, the late Roswell L. Colt, son to the society's former superintendent, purchased, at a depreciated price, most of the stock, and infused new life into the concern. At a meeting held at Jersey City, in April, 1814, a re-organization was accomplished, Mr. Colt being appointed principal agent, and his brother superintendent of the works. Both possessed, in an eminent degree, the disposition to undertake great enterprises with the judgment and knowledge of details required to carry them into execution, added to which was the hearty good will of their fellow-citizens generally. The elder brother paid the debt of nature in 1857; Mr. John Colt is still a resident of Paterson.

The peace of 1815 once more proved disastrous to the interests of that growing community, only two mills being able to continue running, while most of the manufacturers had become bankrupt. Our markets were suddenly deluged with an influx of foreign fabrics which had been accumulating for years, and were transported hither for the express purpose of ruining our domestic industry. The attempt was too successful. A second time was the place almost emptied of its population, who were obliged to betake themselves to other pursuits. The streets were again deserted; mills were locked up and stood in gloomy solitude; the spindle rusted in its socket; the wheel rotted in its pit; and the spider wove his cobwebs upon looms whose clatter had drowned the workman's song. "Order reigned in Warsaw!"

The recovery from this prostration was tedious, accelerated somewhat indeed by the tariff of 1816, for which the country is mainly indebted to the exertions of Francis Cabot Lowell, of Massachusetts. Yet it was many years before all the factories had resumed operations in full, and that under a new set of proprietors. In 1827, the census, taken by the Rev. Dr. Fisher, showed that the place contained fifteen cotton factories with two canvass mills, employing 1,453 hands, besides extensive machine-shops and iron-works. In 1832, the number of cotton mills had increased to twenty, with four machine-shops and two bleach-works, giving employment to 2,543 hands.

Finding the applications for water power exceeding the supply, the society had before this decided upon constructing the upper or third canal. This was commenced in 1827, and water let into it in May, 1829. It was not, however, until 1846 that the works were completed, and the present channel which crosses the ravine constructed. During this period they erected a number of factories, which they leased out to various parties, never having themselves resumed manufacturing since 1796.

The industry of Paterson received a third shock in 1834 and 1837 the former caused by a bank failure, the latter from the great monetary derangement then affecting the whole country, together with the spirit of speculation which had just before been raging. From that time until 1842 the place languished, only one cotton mill (Carrick's) having run throughout the crisis. As had been the case on previous occasions, many establishments passed into other hands. But in the meanwhile, a greater variety of pursuits had been introduced, locomotive building, paper-making and the silk manufacture being among the number. From 1842 to 1857 there was a period of pretty steady prosperity, somewhat diversified by the failure of the People's Bank, in 1851, and a temporary reverse in 1854. The collapse of 1857, when nearly every factory again stopped, and 5,000 persons were suddenly thrown out of employment, is too painfully fresh in the public mind to require further notice in this place.

On the whole, we may state that Paterson has suffered from four almost complete prostrations, each about twenty years apart—in 1796, 1816, 1837 and 1857. On each occasion the numbers employed had increased largely over the preceding occasions; but the means accumulated having advanced in a greater degree, the recovery was more rapid and certain. It would be folly to expect exemption from these visitations in future, perhaps at corresponding intervals; let us hope, however, that more extensive preparations will be made to meet the enemy, and that he may be foiled with less effort and sacrifice than hitherto.

The present officers of the Society for Establishing Useful Manufactures are—Morgan Colt, governor; A. S. Pennington, deputy-governor; and Thos. O. Smith, secretary and agent. The stock is still mainly held by members of the Colt family.

It has already been stated that machinery was made in Paterson for the society in 1793. A portion of this factory continued to be thus occupied until the suspension. In 1795, a lease of part of their premises was executed to McIlwhame & Clarke, who undertook operations on their own account. Dissolving partnership shortly afterwards, Mr. Clarke prosecuted the business until the building was destroyed. During this period he filled numerous orders for the East, and is believed to have built the first wool machinery ever made in this country. Mr. Clarke was a native of Scotland. In 1809 he laid the foundations of the Beaver Mill, in part of which he carried on business until the general prostration of 1816. In the partial revival which followed, the shop was once more started by John Clarke, Jr., who associated with himself, as partners, first Thomas Rogers and afterwards Abraham Godwin, Jr. A considerable part of their business at this time was the building of power looms which had just come into successful operation, and were being introduced extensively. In 1822 the firm purchased Robert Collet's cotton-mill, and built the present Danforth machine-shop and foundry (half size). Eight years afterwards Mr. Rogers withdrew, when Charles Danforth was admitted. The reputation of his improved spinning-frame, then recently patented, soon created an abundant demand for work, and orders poured into this establishment, which, consequently, had to be enlarged. Mexico was then making an effort to enter upon a career of industrial progress, and Paterson shared abundantly in her favors, not a few of which ultimately took the shape of claims against the United States government, to be settled at considerable loss after vexatious delays. In 1840 Mr. Danforth purchased the interest of his other partners, and for several years conducted the business alone.

On the withdrawal of Mr. Rogers, he proceeded to erect the (old) Jefferson Mill, designed for making machinery and spinning cotton yarn; the latter idea, however, was never carried out, in consequence of the increasing demand for the former. Shortly afterwards a partnership was formed with Morris Ketchum and Jasper Grosvenor, of New York, under the title of Rogers, Ketchum & Grosvenor, which continued until the death of Mr. Rogers, in February, 1856. Attention being turned to the building of railroad machinery, in 1835, Mr. Rogers made a large number of car-wheels and axles; and, in July following, commenced work on his first locomotive, the *Sandusky*, for a railroad proceeding from that city. This engine was completed in October, 1837, having required for its construction sixteen months, during which time tools had to be built, experiments made, and the men to be instructed. The *Sandusky* was furnished with a truck, a single pair of driving-wheels, and cylinders 11 inches in diameter. Her weight was about 15 tuns. At a recent date she was still in a serviceable condition—the first of a thousand which have since been built at these works.

In spite of financial revulsions, the Rogers' establishment continued to go on and prosper, increasing its dimensions with the growth of business. When it is considered that the pioneers of industrial enterprises have generally gone to the wall, the successful career of this firm is the more to be wondered at. But the New York partners were men of abundant means and decided financial ability; while Mr. Rogers joined to great penetration and an indomitable will, sufficient cautiousness to make his judgment one of the best. Many valuable improvements were brought out at this establishment for the first time in this country, or indeed anywhere. Among these may be mentioned expansion braces, the counterbalancing of driving-wheels, hollow-spoked cast-iron wheels, the horizontal cylinder and spread truck, &c. Since 1849, more particularly, have these engines taken the highest position, so that Paterson locomotives are now admitted to present the most perfect type of any built. Mr. Rogers was a native of Connecticut, emigrated to New Jersey about 1812, and at the time of his decease was in his 66th year.

In June, 1856, the company organized under a charter previously obtained. The number of employees at present engaged at these works is 550, who turn out about 80 locomotives per annum, besides other machinery. It would be impossible, within moderate limits, to name even the principal roads to which these have gone. For the Illinois Central alone, over 100 have been built. Two Rogers engines lately distinguished themselves by a victory over English machines on the Southern Railroad of Chili.

Jacob Rogers, son of the former proprietor, is president of the company. The office of superintendent has for several years been filled with eminent success by Wm. S. Hudson, the patentee of several valuable improvements in the locomotive.

The New Jersey Locomotive and Machine Company begun operations in 1847, under the name of Swinburne, Smith & Co. Their first engine, for the New York and Erie Railroad, was finished in May, 1848, on the premises now known as the Franklin Mill. In the following year they built and removed to their present extensive concern, and early in 1851 were incorporated under their present title. Up to this time the number of locomotives turned out from these works is 225, of which 70 were for the Erie Railroad, many of them among the finest and most powerful machines on that line. This shop has also furnished engines to the Pennsylvania Central, the Grand Trunk, the Lake Erie and Huron, the Delaware and Lackawanna, the New Jersey Central, the Ohio and Mississippi, the Virginia and Tennessee, and the South Carolina railroads. Formerly, this company built considerable cotton machinery; but of late have confined themselves to engines and other railroad machinery, such as boilers, lathes, tools, &c. The number of employees engaged is 170; capacity of the shop about 30 engines per annum; the number turned out this year will be about 25. James Jackson is president; Saml. Smith, vice-president; and H. Uhry, superintendent. Mr. Uhry is well known for his valuable improvement to the cut-off, lately applied with success to stationary engines.

In the summer of 1851 Wm. Swinburne withdrew from the above-named company, and erected an extensive locomotive-shop, and other works, near the railroad. This was the first large concern now existing in Paterson driven by steam power, since which time numbers of these have gone into operation, forming a tier nearly a mile in length. As many as 250 employees were at one

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time engaged at these works, and about 80 engines turned out, chiefly for the Chicago and St. Louis, the New Haven and New London, the Buffalo and Corning, the Canandaigua and Elmira, the Orange and Alexandria, the Camden and Atlantic, the New York and Erie, and the Marietta and Cincinnati railroads. The establishment has not been in operation since the Fall of 1857.

The Danforth Locomotive Works commenced operations in 1853, under the superintendence of John Cooke, formerly manager of the Rogers' works. Since then 160 engines have been turned out, principally for the New York and Erie, the Delaware and Lackawanna, the Camden and Amboy, the New Jersey Central, the Morris and Essex, the Mobile and Ohio, and the Ohio and Mississippi railroads. This concern now comprises, in addition to the cotton factory, a foundry with 100 men and boys engaged; a machine-shop with 175; and a locomotive, boiler and blacksmith-shop, with 230 employees. The last has a capacity of 35 engines per annum, and will complete nearly that number the present year. The foundry casts about five tons daily. For the past fifteen years the machine-shop has turned out over 10,000 spindles per annum, principally of the Danforth patent. The entire sales of the establishment have averaged half a million dollars annually for some years. Mr Danforth is a native of Bristol county, Mass. His patent, since improved, has been extensively introduced into England, where the invention is known as the "American Spinning-frame."

The growth of locomotive building in Paterson led, in 1852, to the formation of a company to carry on the business of forging axles, tires, frames, and other heavy engine work. Under the title of the Paterson Iron Company, a charter of incorporation was obtained, and their buildings completed in the following year. The works are driven by a steam-engine of 40-horse power, and are furnished with four powerful trip hammers (three of them Kirk's patent). Up to the present time this company has imported nearly 7,000 tires and manufactured forgings for 1,700 locomotives. The shops have facilities for turning out annually 1,800 tires, and forgings in proportion. In the rolling of tires a machine has been invented by the superintendent, which makes them round and true; consequently, they require no boring before being put on the wheels. The number of men now employed is about 40; annual consumption of Cumberland coal, 2,500 tuns. F C. Beckwith is president, S. Jaqua, superintendent.

The manufacture of flax, hemp, silk, and other machinery, was commenced by Todd & Mackay (now Todd & Rafferty) in 1847. Four years afterwards they purchased the Holseman Mill (since enlarged to double its former size), and put up a new foundry. Nearly all the rope machinery in the United States and Canada has been made by this firm, together with heavy orders filled for Great Britain and Russia. The proprietors lately "bearded the lion in his den" by dispatching a considerable quantity to London that had been ordered from their works. Two years ago they added to their business that of building stationary engines, furnished with Uhry & Luttgin's cut-off. These have already been sent to all parts of the country, as well as to Cuba, Mexico and South America. The whole number of hands now employed by them is 135.

John E. Van Winkle entered upon the business of making machinists' and engineers' tools in 1849. His work is mainly executed to order, and employs 25 hands. Mr Van Winkle has just moved into a new shop, giving him many additional facilities.

In the early part of 1851 the firm of Wm. G. and J. Watson commenced making machinery in the Henry Clay or Nightingale Mill. Since then they have also enlarged their works by the erection of a new foundry, and now employ 70 hands, mostly on tools, millwright work and general jobbing. Their products have gone to Mexico and South America, as well as the principal places in this country. At this concern, a pair of bevel wheels, nine feet in diameter, with four inches pitch, eighteen inches face and weighing seven tuns, were lately made for Higgins' carpet factory in New York. A large Corliss steam-engine, and several turbine wheels, were also built there.

The Machinists' Association, consisting of seven practical mechanics, was also formed in 1851, each member contributing $200 in money and a portion of his time. Their *debut* was made in an apartment of the Star Mill, where they have continued to the present, engaged on cotton, wool, flax and silk machinery, with millwright works, &c. Two years afterwards the mill was burned down, involving them in a heavy loss. Nothing daunted, however, they made a purchase of the ground and rebuilt the mill (a large four story brick edifice) A new foundry has also been added. Probably this has been one of the most successful examples on records of the results of associated labor. The establishment was this season assessed at $25,000, clear of all obligations. Much of the work turned out has gone to the southern States. About 100 men and boys are employed. All the members, foreman included, follow their usual avocations.

In 1856, T. C. Simonton & Co laid the foundation of the Paterson Steam-engine Works This concern has since been enlarged to double its former dimensions, by the erection of a new foundry, smith-shop and boiler-shop, and has now a force of 140 men engaged, chiefly on stationary engines. Great numbers of these have been sent to the South and West, also to Mexico and South America. The proprietors execute orders for millwright work, silk machinery, braiding-machines, and the like. They are now building a Blanchard boiler, with patent cut-off, for the Essex Mill, claimed to effect a saving of 50 per cent in the consumption of fuel. Steam power is used to drive the machinery. The value of work turned out annually is about $100,000.

[To be continued.]

MANAGEMENT OF BOILERS AND KITCHEN RANGES.

MESSRS. EDITORS:—When I consider the great number of vessels propelled by steam-power, also the great many factories, shops and hotels in which steam-boilers are employed for working engines and for heating purposes, I am surprised that we do not have more accidents from explosions. I make this statement from a knowledge of the fact that many persons are employed to superintend boilers, without regard to their abilities as sober and skillful engineers; the consideration of their engagement being cheap labor. Those who employ skillful, experienced and temperate engineers deserve honor and praise for their sagacity and prudence, as they save more per annum by the care exercised in economizing fuel and in saving repairs.

In managing a gang of boilers every engineer knows how difficult it is to maintain the water at the same hight in all of them. I believe the only safe arrangement is to have a hand valve to each, and to pump and maintain water separately in each of them. In this manner any number of boilers may be managed as safely as one.

By the following formula the effect of an extra pressure, in any boiler, of one pound on an inch, is plainly shown:— As 1 cubic foot (1728 cubic inches) of water weighs 62.5 lbs. therefore 1 lb. of water will contain— $1728 \div 62.5 = 27.64+$ cubic inches, or a column of water standing upon a base of one square inch, over 27 inches in hight. We are now enabled to see the effect, in the case of one boiler producing more steam than another, and how the exerting of half a pound extra pressure would make the respective difference, in hight of water, to be more than 14 inches, enough, surely, in most forms of boilers, to produce a state of danger. The more defective the arrangement, the more skillful must the engineer be, to manage the case successfully,

I will now make some remarks in regard to explosions in kitchen ranges, a subject which I have never seen treated in any publication. In these the perpendicular hight of the feed water is the only pressure they are required to sustain. If the water is not drawn as soon as soon as it commences to boil, or before, steam will be generated, the feed water driven back through the pipe, and if the fire is active there will soon be a "tempest" in the kitchen. There seems to me to be great difficulty in explaining this kind of explosion, and also that of boilers blowing up under a low pressure, by the theory recorded on page 133, present volume of the SCIENTIFIC AMERICAN, where great pressure and the weakening of the boilers by heat, are assigned as the "true and only cause of all explosions." This I think is the direct cause of bursts and collapses, but it does not seem to account for those violent explosions under the small pressure of low steam. I recently examined a boiler which exploded, and the parts which gave way were not exposed to the fire at all, at were in contact with the atmosphere.

In regard to ranges if the steam becomes superheated, the pressure is not increased because the water recedes in the pipes, and the steam is constantly condensed as the supply pipes are buried in the ground.

My theory of these explosions is that the deposits of matter in the water-back, boiler, &c., are burned when the water gets low, and thus an explosive element is generated. The only safe way to manage a range is whenever the water is near the boiling-point, to commence drawing it off, even if it is not wanted for use, because this brings cold water into the *back*, and prevents the generation of steam.

At St. Luke's Hospital, corner of Fifth-avenue and Fifty-fourth-street, I am managing a set of 60-horse boilers erected (by Nason & Dodge, of this city) which are so well adapted to the work of warming, ventilating, cooking, pumping, &c., and so economical in the use of fuel, that I invite a call from all those who desire to see them and the noble institution in which they are placed.

J. G. WHITLOCK.

New York, Oct. 26, 1859.

BOILERS OF STEAMERS.

The United States steam-frigate, *San Jacinto*, is fitted with a Martin boiler and a flue-boiler, of about equal capacities; and as she is now upon a cruise on the coast of Africa, a good opportunity will be afforded of testing the relative qualities of each. In what is called the Martin boiler the tubes contain water and communicate with water-spaces above and below, while the heated products of combustion pass around them. This principle is not new, but a patent was obtained by D. Martin, chief engineer of the navy (U. S.), for some modification and arrangement of the tubes and flues, hence the name given to the boilers constructed under his superintendence. The tubes of the other boiler are smoke flues; the heated products of combustion pass through them while they are surrounded on the outside by the water. It is claimed that the evaporative effect of the water tubes is superior to that of the smoke flues, and this is a plausible claim inasmuch as a greater water surface is exposed to the heat. It has been stated that in a trial of 72 hours each, the Martin boiler evaporated 18 per cent more water with the same amount of coal. This is a very great saving in fuel; but on the other hand, it is asserted by some practical engineers that the water tubes in marine boilers wear out much faster than the flue tubes, that they are more liable to form scale, and that, although they may be more efficient when clean and new, they do not continue so efficient on a long voyage.

The *San Jacinto* left New York, on her cruise, on the 18th of July last, and reached the Cape de Verde islands on the 18th of August, having run all the time under steam. Word has been received that the Martin boiler exhibited a decided superiority during this voyage, but this short trial is not sufficient to settle all the questions involved in the issue. To marine engineers this is a subject of great importance, and the results will be looked for with much anxiety.

CHEMISTRY AND STREET DIRT.— The New York *Courrier des Etats Unis* states: "An ingenious French chemist at Lyons has just hit upon an expedient which promises to make the 'dusty highway' a dream of the past. It has already been tried with great success in two of the leading thoroughfares of the city of Lyons. It consists in sprinkling hydrochloric acid on the macadamized way. After a baptism of this sort in the morning, the soil of the Place Bellecour, at Lyons, although very light and gravely, is found at high noon to remain as solid and moist as if it had just been well watered, and the wind fails to fan it into that fine dust which is the Egyptian plague of all great cities in warm weather. Nor does it appear to be necessary that the application should be very often renewed. Once well saturated with the acid, the ground shows each morning very much the firmness and neatness which follow a hoar frost."

[Just think of sprinkling streets, with muriatic acid! Unless greatly diluted with water it would be a most desperate operation, involving a vast expenditure, and *burning up* the boot-heels of every one who dared to set foot on the pavement.—EDS.

The Wilmington (Del.) *Republican* ridicules the statement of the Philadelphia papers concerning the water-gas experiment. It says it was a decided failure—gave "a very poor light, and emitted a horrible odor!"

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FOLLIES IN FOOD.

We take the following sensible extract from an article in *Once a Week*, by the well known Miss Martineau:—

Taking society all round, it appears that more young people are killed by mistakes about food than about anything else except air. The mistakes about food are so various, so opposite, that, while we are ashamed of our ignorance, we may may hope for a great saving of life when we grow wiser. "Doctor," said an American clergyman to the family physician who was attending the mother, "do look at that girl's tongue." "Oh, father, I am very well," said the young lady, "as well as I always am." But the doctor looked at the tongue, and observed that it was just as white as every young person's tongue he looked at. "They are all alike," said he. "Why? Why people must have more or less fever while they eat as young people eat here; and without proper exercise too." He criticised the American diet; which it is not our business to do while we have so much to correct in our own. The young people in both countries suffer and die in much the same way; the Americans more and the English less; but both very unnecessarily. The mistake is the same, whether the diet be the same or different.

The mortality detailed by Dr. Farr relates, we must remember, to all classes. When we read of errors in diet, we usually think of the table of the rich, as we imagine them, and suppose that luxurious people are over-fed. In the first place this appears to be a mistake, by the testimony of physicians; and in the next, if it were true we need not dwell upon it, because the rich and luxurious must always be the smallest class of the English or any other people. It is enough to say that wise modern physicians have been heard to declare that English ladies are not, generally speaking, sufficiently well fed. They take enough in bulk, but not nutritious and reparative food. They would be more robust and less nervous if they lived more like ladies did in Queen Elizabeth's time, consuming more beef and manchet and (if earned by strong exercise, not otherwise) good ale. As for the late dinners which we are all so shocked at, they had better be called suppers. If the gentlemen do not take a substantial luncheon in the middle of the day, they ought; and the ladies do. They in fact dine with the children at one or two o'clock. The leg of mutton or cold beef then is their real dinner. They have tea at five or six, with or without children; and then, if they choose to call the eight o'clock meal dinner, they can; but it in fact answers to the supper of old days. A few spoonsful of soup, a wing of fowl or game, a plate of jelly or cream, and ice and fruit afterwards, may be all very pretty, but it bears no comparison as a dinner to the mutton and pudding at two o'clock. Many gentlemen do make their real dinner at the nominal time; and hence the great amount of disease among professional men, and the rich merchant class in London. Now it is the stomach that gives way, and now it is the nerves. Paralysis knocks down one, choleraic disease carries off another, and dyspepsia makes life a long misery to a third; and who can wonder, when that class of gentlemen breakfast early (if men of business in any way), and work their brains all day, without another proper meal, or perhaps any food at all, for twelve hours? The expenditure of alimentary material may be great in the kitchens of the rich—as in the making of the famous white soup in the Queen's kitchen—but the higher classes are not in this country over-fed.

The next class is nearer to reason in its ostensible practice than perhaps any other in the country. Three meals a day, with a small interlude, and at nearly reasonable times, seem to promise well; and if one sort of citizen is better nourished than another, it is probably the ordinary man-of-business in town and country, who likes his joint and pudding at dinner, and the loaf of good homemade bread, with country butter and eggs at breakfast and tea. Yet there are drawbacks here. The wife is not complacent about her table, and her daughters do not eat as girls should; and her sons at times look critical. The fault here is, not in the theory, not in the hours, not in the tradesmen who supply the house, but in the cookery. Without incurring the reproach of grumbling at one's own age of the world, or saying that "the former times were better than these," one may state the plain fact, that the custom of our country used to be for the housewives of all ranks to be responsible for the table at home, and to claim that responsibility as a matter of right—as a point of honor as well as of duty. To declare this is to say that the case is otherwise now.

A COMMON ERROR IN DRAINAGE.

The drainage of lands is a branch of agricultural engineering in which our people are beginning to feel a deep interest. Having, at various times, presented considerable information to our readers on this subject, we also take pleasure in quoting the following extract from our cotemporary, the *American Agriculturist*:—

The most of the draining yet attempted in this country is with open ditches, and in swamps. Three cases have recently come under our observation, in which the failure is traceable to a common cause.

Mr. A——— reclaimed a swamp of 12 acres. It was thickly covered with brush, and had made a heavy turf of roots and moss, a foot or more thick. A deep, wide ditch was run through the middle, with a few side ditches running at right angles with the main ditch. There was no ditch put around the border to cut off the springs from the side hill. There was a good fall, and these ditches took off all the water from the pond, and made the whole swamp ready for the plow. In 1856 he had good crops; and in 1857, still better—some of the stoutest corn in town. In 1858, the corn was not as good, even with the application of manure; and in 1859, the corn crop is a decided failure. The land had settled somewhat by the decay of the roots and vegetable matter in the soil, and had become so compact that the water from the sides could not readily escape into the ditches.

Mr. B——— drained some four acres with tile running from the edge of the swamp into a main open ditch in the middle. The tiles were put four rods apart; and, even with this imperfect drainage, the land was very productive for four or five years, bearing good hoed crops, and still better grass. Last year it was taken up a second time, and the corn was a failure, owing to the excessive moisture of the land. No border ditch had been made to cut off springs from the upland.

Mr. C——— had some 10 acres of low wet land, underlaid by a hard pan, the soil in no place more than 18 inches deep. A small brook ran through the middle. The bed of this was lowered some two feet; and two other ditches, at a distance of about 10 rods, were dug, going no deeper than the hard pan. There was no border ditch; and, besides this error, Mr. C. fell into two others—having only one ditch where the land needed three, and digging only 18 inches where he should have gone down three feet. The land lies on an inclined plane, has a good fall, and might easily be made to produce two tuns of good herdsgrass to the acre. Instead of that, the wild sour grasses have never been eradicated, and it has never yielded over three-quarters of a tun of hay to the acre.

These gentlemen are somewhat inclined to look upon drainage as a humbug, when that term is more appropriately applied to the style of their works. It was not more than half done. A border drain is indispensable in all cases of reclaiming swamp land. This cuts off the enemy from the outside, and leaves the other ditches to dispose of the surface water.

"These open ditches are but a poor substitute for thorough drainage, at best; but they are the first advances toward the improvement of wet land likely to be made by most farmers. It is of great importance that the errors pointed out in these cases should be avoided.

DEATH AMONG THE GOLD-FISH.—Whenever you meet with folks who keep gold-fishes in the old-fashioned glass globes, you will be sure to hear the melancholy complaint that they *will* die in spite of every care taken to preserve them. The water is changed most regularly, the glass kept beautifully clean, the vessel shaded from the sunshine; yet, alas! death is always busy amongst them. Is it internal disease? Is it external fungi? No; the cause is *starvation*. Every other pet is expected to eat, but these gold-carp are expected to subsist on—nothing! But don't they eat the animalculæ? Nonsense! Give them a few earth-worms, or angler's gentles, twice a week, and to prevent the necessity of frequently changing the water, throw in a handful of Anacharis (water-weed); and instead of floating in succession "on their watery bier" they will get plump and healthy, and grow as rapidly as in their native waters.—*Recreative Science.*

A MILLIONAIRE INVENTOR'S CARRIAGE.

"Give me nature and a day," says Ralph W. Emerson, "and I will make the pomp of emperors ridiculous." This is the remark of one who is a philosopher and a poet. A shrewd, active, enterprising, energetic business man finds a good patent right a sufficient aid in accomplishing the task for which Emerson invokes the sublime beauties of nature. In our list of patents granted this week may be found a statement of the nine distinct claims by which Mr. Singer, the sewing-machine inventor, has protected his wonderful carriage. As this carriage has attracted much attention, and as it marks a step in the rapidly-increasing strength and success of inventors, we give a brief description of it. Without the aid of diagrams, we cannot attempt to give a full understanding of the various contrivances for the safety, comfort and convenience of the occupants, but we can give a general idea of the structure. It is a large *coupe* carriage, much wider than a common coach, the wheels being the same distance apart as those of an omnibus. The body of the coach is hung very low, and two seats, of the ordinary form, extend across it, each capable of accommodating three ladies in crinoline. Back of each of these seats are two single seats, facing each other, so raised that their floor is on a level with the lower seats, and which is entered by openings in the back of the lower seats, made by turning down the middle portion of the back, which is hung on hinges for this purpose. Thus the body of the coach will seat 10 persons, and two more are accommodated in the *coupe*, making 12 inside. Seats for 14 persons are provided on the outside, making 26 in all who can be carried at once by this vehicle. The *coupe* is behind the body of the coach, with which it communicates by a door.

We cannot entertain our readers with full details of all the contrivances which the ingenious inventor has combined in this costly vehicle, the expense of which exceeds $3,000, but will add that it has an extensive apartment for baggage, a room for ladies to arrange their toilet, a receptacle for carrying dogs and poultry, a water-closet, &c.; the whole being drawn by six horses, driven three abreast, after the style of a Russian nobleman's equipage, and resembling more than anything else a continental emigence of the olden times.

In the royal establishments of Europe are numerous state carriages, and by means of the illustrated newspapers—one of the great blessings of modern civilization—we have formed very full ideas of their appearance; we know how painting and gilding have been lavished in vain efforts to counterbalance the lumbering clumsiness of the design. In looking at Mr. Singer's carriage, its yellow and orange, its glossy varnish, its glittering lanterns and polished silver, the remark of Emerson which we have quoted occurred to us, and we thought how easy it is to make the pomp of emperors ridiculous. When we consider the matter, why is it not just as rational and just as fit for a democratic sovereign, who has made, by his own genius and energy, the money which he expends, to indulge in display of equipage, if such be his taste (however questionable that taste may be considered by people of boasted refinement), as for those hereditary nincompoops to do it, who, by the imbecility of their subjects, are permitted to rank themselves among the mighty rulers of the earth?

THE BATTIN PATENT CASE.

This suit noticed in our last issue, as having been in progress before Judge Geer in the U. S. Circuit Court, Philadelphia, was given to the jurors on the 20th ult, and next day they came into court and said that they were unable to agree upon a verdict. The foreman stated that they had spent the whole night in examining models and papers, and they understood one another so far as to have come to the final conclusion that although they were to remain a month longer in deliberation they could not come to a unannimous decision. Judge Greer, in answer to this, said he was disappointed in the result, and that he considered it as plain a case as ever went before twelve men, if they believed evidence at all. "But if you are determined, gentlemen," he said, "not to agree, I can do nothing but discharge you. I do not think that when men once get their minds fixed, there will be any agreement." The judge declared his firm conviction that the patent was untenable, and he advised the plaintiff to cease litigation, as they could get no remedy in chancery while he sat on the bench. He told them they might cause one another a vast expenditure of money, without obtaining any good results.

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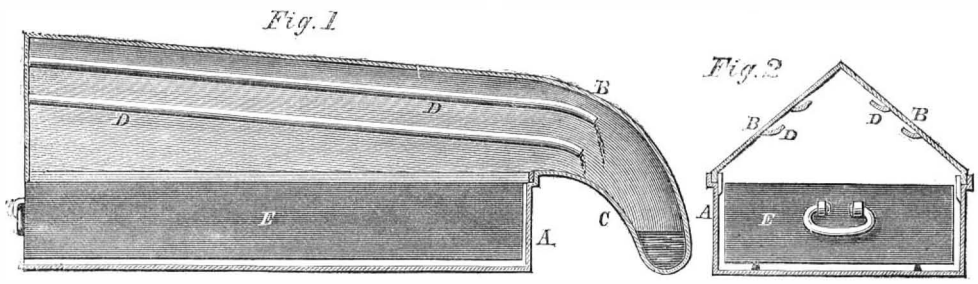
IMPROVED COAL OIL RETORT.

There are a few new arts that are destined to grow very rapidly to gigantic proportions, and one of the most prominent among them is the manufacture of oil from coal. The process and the implements will no doubt be the subjects of very numerous improvements which, as our illustration shows, have already begun to be produced. This improvement is in the retort, the first essential in the apparatus. Coal oil is made in a mode very similar to that employed in the manufacture of illuminating gas, that is, by heating bituminous coal in a retort, and partially decomposing it, the oily portion being evaporated and re-condensed, in other words, distilled.

Fig. 1 represents a longitudinal vertical section of the retort with its neck, and Fig. 2 the end or head.



HAZLETT & HOBBS' COAL OIL RETORT.

A A is the base or rectangular portion, and B B the upper portion or sides, inclining from the base towards eaeh other, and meeting at the top, which is made inclining downward to the neck, C. D D are open gutters in the interior of the retort, descending from the head along each side, and terminating in the neck. E is a drawer resting on two rails, which raise it so as to leave an air-space between it and the bottom of the retort. The inventors say: "The object aimed at in our improvement is to facilitate and expedite the carrying-over of the charge with the least deleterious effect upon the substance to be distilled, and upon the wear of the retort. The base portion alone is exposed to the fire. The introduction of the pan on rails prevents the charge from charring or burning, by supplying an air space between the pan and the bottom of the retort, and the rails on anti-friction principle greatly facilitate the introduction and removal of the drawer. Two pans being used to each retort, one is removed and the other introduced, occupying but a moment's time. The top portion, by its comparatively low temperature, becomes a condenser of the oleaginous vapor. This (the top) is inclined towards the neck, to hasten the escape of the condensed matter thither, within the top. Set inclined toward and emptying in the neck are open gutters which receive the condensed vapor, and carry it off to the neck, preventing ing effectually the return of the oil to the fire-surface to be re-distilled, a process which constantly occurs in the coal retorts commonly used, and which deteriorates the oil, destroying its volatile constituents and illuminating properties. Our retort is admirably adapted for the purification of the crude oil, by distillation—occupying but little time, is easily cleansed, and is entirely safe from fire. We procure from this improvement a rapid carrying over of the charge, admitting of at least four charges per diem, and we produce a better oil than can be had from any retort now in use."

The patent for this improvement was issued May 31, 1859, to Hazlett & Hobbs, of Wheeling, Va., to whom inquiries for further information in regard to it may be addressed.

A "RIP VAN WINKLE" ON INVENTIONS.

"*Self-weighing Beehives.*—Here is a chance for Yankee ingenuity. It is to make a weighing-balance on a cheap plan, so that every bee-keeper can afford to attach one to each hive, upon which it hangs suspended, to indicate each day the weight of the swarm and its stores. Such a thing would prove highly satisfactory, and should at once be invented."

We copy the above extract from the New York *Tribune*. If the writer had been familiar with the progress of invention, or had even read what he calls "a self-styled scientific journal," he would not have had an occasion thus to heat up the inventive genius of the readers of the *Tribune* to invent what is already well known. Self-weighing beehives have already been invented, and as an example, we refer the above writer to the illustration of a very simple self-weighing hive on page 156, Vol. XIII., SCIENTIFIC AMERICAN.

The New York *Tribune* also published the following:—

"*Planing Sawed Shingles.*—A letter before us describes a machine that planes one side of sawed shingles perfectly smooth as fast as they come from the saw; and the writer says it does not take much power, or add much to the cost. If this can be done, we may consent to use sawed shingles, and try to believe them as good as split and shaved ones when those are not to be had."

There are a number of shingle machines patented in which planing-attachments are combined with circular saws, and so arranged that the shingles are planed as they are sawed from the bolt. This, in fact, may now be considered an old invention. It is a valuable one, however, for the planing of a sawed shingle not only improves its appearance but admits of a smooth application of paint with a moderate absorption of oil, and if not required to be painted, they admit of the water running freely off of them. Shingles sawed from straight-grained wood are but little inferior to rived ones. We have illustrated and described, in the SCIENTIFIC AMERICAN, beautiful automatic mechanism designed to effect this object. It so happens, also, that we have now in our office a model of a machine for this purpose; and we shall be most happy to exhibit it to the writer of the above notice, whenever it may suit his convenience to call on us. We shall also be happy to place at his disposal, for examination, the entire library of our office; also, the fourteen last volumes of our journal, which contain at least five thousand illustrations of different inventions. Moreover, we will cheerfully furnish this ostensible man-of-science with a "proof" of our weekly review of patents, for publication, providing we receive proper credit for the same. By adopting this feasible course he will thus be saved from further blundering on subjects in reference to which he appears to be a novice.

FAWKES' STEAM PLOW ABROAD.

Our able cotemporary in Dublin, the *Irish Country Gentleman's Newspaper*, of Oct. 1st, copied our article on the above plow, accompanied with an illustration, very neatly engraved, and in its subsequent issue of the 7th ult., a correspondent writes to the editor as follows:—

"SIR:—The agricultural interest must feel much indebted to you for your excellent wood-cut and description of Fawkes' steam plow in your last, which is likely to make such a change in farming; the American papers appearing confident of its plowing 40 acres a day. This ought to put our machinists on their mettle. Shame to see our transatlantic cousins showing us how to make reapers, baby-jumpers, sewing-machines, and all other articles for saving labor."

PLATINUM has a greyish-white color. In the state of fine powder it is grey, and without metallic luster; but the luster can be produced by friction. Platinum is the heaviest of all metals. (Specific gravity 21·5.) It is harder than copper, but not so malleable as gold and silver. It can be drawn into exceedingly fine wire. It cannot be melted by the heat of a furnace; but it can be fused by means of a blowpipe, supplied with oxygen gas, and directed upon the flame of a spirit-lamp. It can be welded at a white heat. It does not oxydize when heated in the air. Platinum dissolves in hot aqua regia, but not in any simple acid. The solution contains chloride of platinum. When pure alkalies or nitrate of potash is ignited with platinum, the metal is coroded. When brought, in the state of a fine, porous, spongy mass, into a mixture of oxygen and hydrogen gas, it becomes red hot, and inflames the gas.

FAIR OF THE AMERICAN INSTITUTE.

The late fair of the American Institute continued to be enriched by new machines almost to its close—some of them among the most interesting of all which were exhibited. We notice some of these, as well as others for which we could not find space heretofore.

KNITTING-MACHINE.

The article that attracts most attention of anything in the fair is, perhaps, Aiken's knitting-machine. This was illustrated on page 328, Vol. XIV., of the SCIENTIFIC AMERICAN, and we must refer those who would like to understand its operation to that illustration and accompanying description, The wonderful thing in relation to it, is the rapidity and perfection with which it works. The yarn is carried round in a circle, and numerous hooked needles catch it and form the looped knitting stitches with a velocity which renders rivalry by the nimblest fingers utterly hopeless. The exclamations of the old ladies who were standing about bore very flattering testimony to the satisfactory working of the machine. The inventor, J. B. Aiken, manufactures his machines for sale at Manchester, N. H.

CARVING-MACHINE.

Among the late accessions to the fair, was Huntoon's paten carving-machine, for carving spiral, fluted balusters, bedsteads, newells, &c. A piece of wood previously turned, is carried along lengthwise, and at the same time slowly rolled, beneath a rapidly revolving cutter with a semi-circular edge, which thus cuts a spiral channel winding around the shaft. Four balusters, or other articles to be fluted, are placed in the machine at once and are all cut at the same time. It does its work very handsomely. Wm. M. Cassidy is the agent, 74 State-street, Albany, N. Y.

WOOD-TURNER.

To see A. D. Waymoth make a wooden pill-box, and cut it from the end of a rough stick, in a small fraction of a minute, seems as much like magic as any of the operations of machinery. He brings up one tool, which turns the stick, another which hollows the box, and by pressing his foot upon a treadle another cutter, a little delicate affair, takes off the finished box from the stick. A similar operation forms the covers. Innumerable articles for toys and for other purposes are made by this plastic machine.

GAS RETORTS.

Another sample of clay retorts for gas-works besides those already noticed, was introduced near the close of the exhibition by the manufacturers, J H. Gautier & Co. The agents in this city are Many, Baldwin & Many, 49 John-street. As a retort costs about $30, and as clay for the material is destined to replace iron in this country. as it has in England, an enormous amount of money is to be expended for clay retorts, and we earnestly hope that our manufacturers will be able to compete in the market with those who import them from abroad.

In our next number we shall publish an elaborate description of clay retorts, giving some illustrations of articles in this line extensively imported by T. Parmelee, whose office is at No. 4 Irving-place, in this city.

INTERESTING EXPERIMENT.—Into a small retort place about an ounce of strong liquor of potash, that is, pure potash dissolved in water, together with about a drachm of phosphorus. Let the neck or beak of the retort dip into a saucer of water, say half an inch deep; now very gently heat the liquid in the retort with a spirit-lamp, until it boils. In a few minutes the retort will be filled with a white cloud, then the gas generated will begin to bubble at the end of the saucer; a minute more, each bubble as it issues from the boiling fluid will *spontaneously take fire* as it comes into the air, forming at the same time the philosopher's ring of phosphoric acid. Care is required in handling phosphorus; but my young chemical readers will, I think, not forego this wonderful experiment for the want of due attention, for, without proper care on their part, I must give up showing them wonders, even greater than this.—*Septimus Piesse.*

NO NITER IN THE DEAD SEA.—Mr. H. Poole, who was sent by the Foreign Office (English) to the Dead Sea, to search for niter, which was reported to occur there, has returned without success. The region of Sodom and Gomorrah will not furnish one of the most essential sinews of war, and the price of saltpeter is very likely to be kept up in spite of the peace.

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NOTES ON FOREIGN INVENTIONS.

Soap.—A patent has been recently secured by Messrs. R. Clegg, F. Angerstein and J. W. Page, of London, for making soap, as follows: Take 112 lbs. of the silicate of alumina, 56 lbs. carbonate of soda, in crystals, and boil them together in as small a quantity of water as possible, and until, on dropping a small quantity on a cool slab, it appears quite hard. This is called "composition A." Now take 112 lbs. each of silicate of alumina and carbonate of soda, and boil them for half an hour in 10 gallons of water, 112 lbs. of brown resin are now added to this, and the boiling continued until the whole becomes a homogeneous mass, when 56 lbs. of composition A are added, and the boiling continued for about half an hour longer, when it forms aluminous resin soap, and is called "composition B." To improve its quality, 14 lbs. of tallow and an equal weight of caustic soda are boiled together (adding fresh alkali occasionally) until saponification is effected, when it is then called "composition C," and is mixed with B, poured into molds, and cut into bars. Composition B may be poured into molds and cut into bars of itself, as it makes a resinous cheap soap without the grease, and may be very useful to employ in the preparation of cotton cloths for the bleaching process in calico print-works.

New Cement.—H. D. Scott, of Chatham, has taken out a patent for a new plastering cement, which is an improvement on a former patent. This inventor's cement is well-known in the London market, and consists of lime highly burned in a kiln in the presence of a small quantity of sulphur; after which it is ground, and used for plastering. The improvement consists in adding an equal amount of dry chalk to the lime treated in the manner described, grinding them both together, and mixing them up with water like common plaster.

Sugar for Brewing, Distilling and Making Vinegars.—There is quite a difference between the character of the spirits and vinegar obtained from cane sugar, and from malt sugar. To assimilate the properties of cane sugar to those of malt and fruits, C. Garton, of Bristol, has secured a patent, the process which he employs being rather peculiar in its character. He first dissolves sugar in boiling water, and places the solution in a trough lined with lead. Above this trough is a shaft with arms attached, for stirring the liquid in the trough at all points. The sugar solution is now agitated for six hours, and its temperature raised to about 160° Fah., so as to bring the liquor to the gravity of 40° Beaume. To each 112 lbs. of raw cane sugar thus treated, 8 ounces of sulphuric acid, of 184° gravity, are now added, after being previously diluted with 24 ounces of water, when the solution is agitated for three hours, then allowed to rest six hours; then it is agitated three hours and six alternately, three successive times, occupying altogether 36 hours; the temperature being maintained at 150° Fah. About 1 pound of chalk is now mixed with a gallon of boiling water, and added to the solution to neutralize the free acid; after which it is stirred well, and the heat maintained for one hour, when it is allowed to rest for twelve. A precipitate of the sulphate of lime now falls to the bottom, and the clear liquor is filtered and ready for use, to undergo vinous or acetous fermentation to produce superior spirits and vinegar.

Photoglyphic Engraving.—This is the name given to the invention of Fox Talbot, for engraving photographs on steel plates by sunlight. The publisher of the *Photographic News* (London) has prepared some plates of rare and beautiful pictures by this process, and has had them printed. The invention was described on page 113, Vol. XIV., of the SCIENTIFIC AMERICAN, but it does not seem to have met with that attention which it deserves from our artists. There is no other process known whereby a metal plate can be engraved entirely by chemical action; nor any other means whereby copies can be taken with such certainty. As we consider this a very valuable invention, we will again describe the process, as given very clearly and briefly by the *Photographic News:*

"A plate (either steel, copper or zinc), having been well cleaned, is to be rubbed with a linen cloth dipped in a mixture of caustic soda and whiting, and afterwards rubbed dry with another clean cloth; this process should be repeated twice. Coat the plate with a solution composed of 1 part of gelantine to 30 parts of water, and about 8 parts of a saturated aqueous solution of bi-chromate of potash. Pour the solution on the plate in the dark room as if it were collodion, drain off the superfluous liquid, and dry over a spirit lamp; the plate is then ready for exposure. Lay the object to be copied upon the plate, and expose in the copying-frame in the usual way—from one to several minutes in the sunshine, and for a much longer period if the sun is depressed; the operator must use his judgment in this matter. When the exposure has been sufficiently prolonged, the frame must be taken again into the dark room, and the plate withdrawn. On removal from the frame, it will be seen that a faint image is imprinted on the plate, the light having changed the yellow color of the gelantine to a brown wherever it has acted. Sprinkle over its surface some very finely-powdered gum copal, and distribute it evenly, care being taken to leave on the plate only a very thin layer. Lay the plate, face upwards, over the flame of a lamp until the copal is melted. This will require a considerable heat, and its accomplishment will be easily perceived by the change of color. When this takes place, leave the plate to cool gradually. This process may be termed laying the aquatint ground.

"The etching-liquid is prepared as follows: Take hydrochloric acid, and add to it as much peroxyd of iron as it will dissolve by the aid of heat. When saturated, filter, and afterwards evaporate it until, as it cools, it solidified into a brown semi-crystalline mass. This substance is per-chloride of iron. It is very greedy of moisture, and absorbs it from the atmosphere, if exposed to it.

"Water dissolves a very large quantity of per-chloride of iron with the evolution of heat. Saturate a small quantity of water with the per-chloride, and pour it into a bottle, with label No. 1. Fill a second bottle with a mixture of five or six parts of this saturated solution, and label it No. 2; and a third bottle with a mixture of equal parts of this solution and water, and label it No. 3.

"When the plate is quite cool, pour on it a small quantity of solution from bottle No. 2, and spread it quickly over the plate by means of a camel-hair brush which has been used for no other purpose. The liquid will speedily begin to act on those parts of the plate on which the light has not acted, it being unable to penetrate through those parts of the gelatinous solution upon which the light has acted. The etching proceeds with considerable rapidity, and should be suffered to continue for some minutes. If the rapidity is too great, it may be checked by adding to No. 2 solution a little of No. 1, doing this with care, as the addition of too large a quantity would render its action too sluggish, and it would require to be stimulated by some of No. 3. When the exact strength required has been thus arrived at, the operator may proceed with confidence in his manipulations. The liquid must be moved about the plate during the whole operation with a camel-hair brush; and when the etching has proceeded far enough, the liquid must be wiped off the plate with a piece of cotton wool, and a stream of cold water poured over it, so as to cleanse it as rapidly as possible; then wipe the plate with a clean linen cloth. When faint portions of the picture fail to appear, Mr. Talbot dips a camel-hair pencil in No. 3 solution, and touches these parts, which causes the details to appear with great rapidity; and it is evident that, in the event of its being desirable to check the action of the liquid on any part of the plate, this could be accomplished by dipping a pencil in No. 1, and applying it in a similar manner."

STRAIGHTENING A CHIMNEY STALK.—Quite an interesting operation was successfully completed in Port Dundas, Scotland, for the restoration of a chimney which had settled out the perpendicular. This was accomplished by sawing several of the mortar beds between the courses on the side from which the chimney leaned, thereby allowing it to come back with its own weight without the application of any external force. Only one draught was cut at a time, to guard against any shock which might have endangered the state of the building, and by keeping the saws wet, a bed of mortar was prepared for the superincumbent weight to settle down upon. Twelve cuts were made in this manner on different parts of the structure, which generally set before the saws had passed through half of the circumference, particularly in those made nearest the ground, where the weight was greatest. The principal dimensions of the chimney are—Total hight, 468 feet; from surface to top of cope, 454 feet; outside diameter at foundation, 50 feet; at surface, 34 feet; at cope, 14 feet.

BARKS FOR TANNING.

The following is the substance of a very useful and interesting article on this subject, in a recent number of the *Shoe and Leather Reporter:*—

There are four species of oak barks chiefly used in tanning. The first is the Spanish oak, which thrives in Maryland, Delaware and Virginia, and in all the States south of 41° N. In the Atlantic States, this species is most abundant, and in Georgia and the Carolinas it is known by the name of "red oak." Its bark, which is thick, black, and deeply furrowed, is preferred for coarse leather, which it makes more pliable and of a better color. Hemlock bark is often with advantage mixed with it. In the southern States, the Spanish oak grows to the hight of 80 feet, having a trunk four or five feet in diameter; while in some of the northern States it does not exceed 30 feet in hight, with a diameter of five or six inches.

The common red oak grows abundantly in Canada and in the northern States, especially in the southern half of New York, in New Jersey, in northern Pennsylvania, and along the ridge of the Alleghanies. Its bark is very generally employed, though inferior in several respects to some other kinds. This tree grows to the hight of 70 or 80 teet, and has a diameter of three or four feet.

The rock-chestnut oak is seldom found in the southern States, but abounds in elevated districts having a broken, rocky surface. On some of the Alleghany mountains it constitutes nine-tenths of the forest growth. Hence the name "rock oak," by which it is known on the banks of the Hudson and on the shores of Lake Champlain. It has received in Pennsylvania, Maryland and Virginia the name of "chestnut oak. Its bark is thick, hard, and deeply furrowed, and differs from other barks in that the epidermis or outer layer contains a large proportion of tannin, which is usually in other kinds confined chiefly to the under layers. In Pennsylvania and New York it abounds, but only the bark of the small branches and young trees is used in tanning.

The quercitron or black oak grows throughout the States, below the latitude of 43° N., and in the more elevated sections of Georgia and the Carolinas. Its bark is not very thick, but is bitter, deeply furrowed, and of a deep brown or black color. It also imparts a yellow color to the ooze; and leather tanned with it is apt to give a yellow tinge to the stockings. This inconvenience, however, may be obviated by an inexpensive chemical process. Quercitron bark is much used, as it is abundant, cheap, and rich in tannin. This tree often attains a hight of 90 feet, and a diameter of four or five feet.

Besides these four kinds are others less known. The white oak chiefly grows in Florida, and to the south of 46° N. Its bark is preferred for leather for saddles, and similar purposes. The scarlet oak is found as far north as lat. 43° N.; its bark is very thick. The gray oak in Maine, New Hampshire, and Vermont; and the live oak is never found more than twenty miles inland; its bark being black, hard, thick, and replete with tannin. Other kinds of oak bark are occasionally used, but not to any great extent in the United States.

Most of the sole leather in our country is tanned with the bark of the hemlock tree, which is unknown in the Old World. The common British oak grows in almost every country in Europe, and is the chief agent used in tanning. It sometimes reaches a hight of one hundred feet, and the trunk grows occasionally to fifteen feet or more in circumference. This majestic tree will stand hundreds of years, and when at a distance from other trees, it spreads its gnarled branches so that its head is often broader than its hight. The foliage resembles that of the white oak of this country. In northern Russia, and in some parts of France, the bark of a shrub called the Kermes oak is used in tanning. This shrub grows to the hight of three to five feet, and bears some resemblance to a small holly tree. The bark of the root is rich in tannin, and is said to produce a very superior quality of thick, durable, impervious sole leather.

In early spring, the opening leaves indicate that the sap is circulating the most actively, and it is found that the bark then contains nearly one-third more tannin than in autumn, consequently in this country, the proper time for barking trees will vary, according to latitude and other circumstances, from the end of April to the beginning of July. Wet seasons and damp localities are prejudicial to the bark and lessen its tanning power. The bark of southern oaks and of such as grow in high ele-

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vated positions is more rich in tannin than that of low and badly drained, damp, and shady locations. In hemlock bark the inner layer contains about 8 per cent of tannin, the middle part about 5 per cent, and the outer part about 3½ per cent.

BOSTON HORSE-RAILROADS.

The recent report of the Boston Board of Aldermen respecting horse-railroads has attracted considerable attention from its liberal policy towards these corporations. The report presents some facts about the passengers transported, which we think are not fully realized by the public. It says:—The number of passengers carried upon our horse-railroads for the last year was nearly 8,000,000, and it must soon exceed 10,000,000 per year. This is over 27,000 passengers per day, Sundays included. The transportation of this number through the streets by omnibuses, or any other kind of carriages, would operate as a thorough blockade.

The number of passengers carried on the Metropolitan road alone, for the present year, is estimated at 5,000,000, or 15,000 per day. To transport this number in omnibuses would require one to start about every 30 seconds, for 15 hours each day. But as the rush of passengers is at morning and evening, the transport of this number by omnibuses would be next to an impossibility, and yet the Metropolitan road carried, on the 4th of July, over 50,000 passengers.

For safety, this mode of conveyance is, we think, in advance of all others, and stands 36 to 1 against steam roads, the fatal accidents on the latter in 1858 being at the rate of 4½ in 1,000,000 passengers, and on horse roads 1 in 8,000,000.—*Boston Courier.*

[These statistics are interesting and valuable regarding the capacity of city railroads for conveying passengers in comparison with stages. There is one expression in the latter paragraph of the *Courier*-which requires explanation. It states that the accidents on the horse railroads have been only as 1 in 36 in comparison with steam railroads, which conveys the idea that the steam-power causes the excess of the accidents, independently of the greater velocity with which locomotives are run. The fact is that steam-engines are just as safe for running carriages as horses according to their speed; there can be no difference in this respect, because they are as easily governed.—EDS.

LAKE SUPERIOR IRON ORE.

The iron ore of this region is, perhaps, the best in the world, and it is now shipped in large quantities to Ohio and Pennsylvania. We think it is not too much to say that the introduction of Lake Superior ore has redeemed the business of making pig-iron throughout the bituminous coal region of eastern Ohio and western Pennsylvania, from the situation of a difficult and uncertain enterprise, and has placed it on a footing of sure prosperity. It has made its way steadily and surely, in spite of natural prejudice, and all the disadvantages of inexperience in its use; and, wherever it has gone, it has made new friends and customers. Next year, not less than 40 furnaces will use it wholly or in part, to supply which will require between 150,000 and 200,000 tuns. The iron ore companies of Lake Superior are making preparations to supply a largely-increased demand next season, to do which, it is only necessary to uncover surface and enlarge openings at the mines, so as to enable a larger number of men to be employed to advantage. If coal was abundant in the Lake Superior regions, of course the iron would be manufactured on the spot. No less than 75,000 tuns of ore have been shipped this season; and the demand was far greater than the companies at the mines could supply.

A BAKE OVEN FOR PARIS.—There has been constructed at one of the machine-shops in the north-western part of this city a large automaton bake oven designed for a company in Paris. It is 20 feet high, and contains 30 cars for pans. The construction of the oven is similar to the one now in use at the mechanical bakery in this city, but the power to move it is entirely different. Steam is only used for the purpose of moving a hydraulic pump, which is so arranged that the cars are moved by this power alone. By this arrangement a large number of wheels are dispensed with and the whole operation of the oven much simplified, and but little steam-power is required to keep it in motion.—*Philadelphia Ledger.*

THE GROWTH OF THE SEWING-MACHINE BUSINESS.

In 1848, we were sitting, with several gentlemen, in an office in Broadway, in this city, when a person came in and invited us to go up the street a few doors to see a new invention which he had to exhibit there. Some of the party went with the gentleman, and in the course of half an hour they returned and made their report. They said it was all a humbug. They found the room full of tailors, and the man had a little machine for sewing cloth. It was worked by a treadle, and, at first sight, seemed to be perfect, sewing with surprising rapidity, and making a straight, handsome seam. But one of the tailors, observing that the exhibitor, before he handed the finished work to the spectators, very deftly tied a knot in the thread, took the liberty of breaking the thread, when the whole seam unraveled as readily as a knit stocking. The company separated with a laugh of derision at the mortified exhibitor. It seems a very short time since this incident occurred, and when we yesterday recalled the recollection of it, while standing in Grover & Baker's new and magnificent establishment for the sale of their sewing-machines, we were impressed, more forcibly than we ever were before, with the marvelous rapidity with which the arts, and especially new arts, are developed in this wonderful age in which we live. This establishment occupies an entire building in the most fashionable part of Broadway, with 25 feet front, and running through 200 feet to Mercer-street. The front is a single iron Gothic arch, three stories high, the two lower stories being formed of eight panes of plate glass, four in the lower story, each 14½ by 5 feet, and four in the second story, each 11½ by 6 feet. The basement is used for setting-up and packing the machines, the space under the Broadway sidewalk making a nice shop for repairs, and the space under the Mercer-street sidewalk being occupied for generating the steam by which the building is heated.

On the first floor is the beautiful salesroom, 25 by 150 feet, 50 feet in the rear being used for receiving, delivering and storing the machines as they come from the manufactory. In the second story, directly over the salesroom, is the receiving-room, where ladies who purchase machines are taught the art of using them. This is an elegant drawing-room, richly carpeted and furnished with the most costly rosewood chairs, lounges, tete-a-tetes, sofas, a piano, &c., and is to be supplied with a select library. The bronze chandeliers in this room were made by Haughwout & Co., in a style corresponding with the architecture of the building. Adjoining the drawing-room is the ladies' toilet room, containing a looking-glass, a marble wash-stand, pins for hanging cloaks, &c.

We were informed that this company have already sold about 30,000 of their machines; this, at an average of $100 apiece, would amount to $3,000,000. The machines are made in Boston, and more than 400 men are employed in the manufacture.

The machines manufactured by this company are too well known by the public at large to need any recommendations at our hands, and we will simply add that we have had one of them in use in our family for some time past, and it is considered the most useful article in the house, next to the cradle, and no less indispensable than that. In No. 2, of the present volume of the SCIENTIFIC AMERICAN, we published an illustration showing the mechanical principles of the Grover & Baker machine. By reference to that illustration, the form of the stitch will be seen, and its security from ripping, as well as its superior elasticity, will be readily understood.

FORWARD CHILDREN NOT APT TO LIVE.— When Lord Palmerston, the present prime minister of England, was a child, he was very feeble and very precocious, so much so that his physician, on account of his health, forbade his continuing his studies. But an indulgent aunt, thinking that depriving the boy of his studies, of which he was excessively fond, would do him more harm than good, continued to instruct him in private. As his health improved rapidly under this treatment, little blame was attributed to the aunt, when she disclosed the practice; though the physician was greatly mortified to find that the recovery was not owing to his prescription. This forward, feeble boy is now, in his 76th year, administering the government of the most powerful empire which the world has ever seen, and is as ready to quarrel with all the nations of the earth as he has been at any time during his long, contentious career.

A COLUMN OF INTERESTING VARIETIES.

Compasses on board of iron ships are subject to so great variations as to render them unreliable guides in navigation. The British Association for the Advancement of Science are making extensive investigations in this matter, and it seems that the mere rolling of the ship sometimes varies the compass to the amount of 24°; but if the ship is built with her head to the south-east, the rolling effects the compasses very little if any.....The motion of the sun and solar system through space toward the constellation, Hercules, is positively known, but the line and velocity of this motion have not yet been ascertained; some observations, however, indicate that the motion may be in an orbit about a point in the vicinity of the Pleiades, and that it will require 18,200,000 years to accomplish one revolution.....Nearly 30 years ago an engine was run in England 32 miles an hour over a common turnpike road.....The vibrations communicated to the air by the human voice are occasionally sufficient to break glass vessels.....When the Croton water was cut off from a large part of this city, Oct. 21st, in consequence of the busting of a pipe, some of the newspaper-offices paid a dollar per barrel for water to run their engines.....Captain Denham sounded in the South Atlantic, between Rio de Janeiro and the Cape of Good Hope, 7,706 fathoms, or nearly 7.7 geographical miles. The appearance of spots upon the sun, with which appearance terrestrial magnetism is so intimately connected, increases and decreases in regular periods of 11 years and 40 days.....Persons sailing in balloons hear the echo of their voices returned from the earth, and, by the time that elapses between the call and the echo, form a rough estimate of their altitude.....The first steamship which made the voyage, under steam throughout, across the Atlantic, was the *Royal William* in 1833. This vessel was of 180 horse power and 1,000 tuns burthen, and was built at a place called Three Rivers, on the St. Lawrence, in Canada. The voyage was made from Pictou, Nova Scotia, to Cowes, Isle of Wight.....The heat produced in the body of a healthy man in the course of 24 hours, if it could be applied, would be sufficient to raise about 7,000 tuns to the hight of one foot.....It is stated that 10,000,000 of hooped skirts are manufactured in this city per year. Haven has made more than 2,000 per day, and still cannot execute their orders. In the name of lost pins where can such a world of emptiness go?.....The presence of cotton in flannel may be detected by boiling a fragment or sample of it in a solution of potash. The flannel will be converted into soap, whereas the cotton will be but little altered, and may be collected and weighed.....Eight millions of bottles are annually made at a manufactory of bottles at Folembray, France. It is the largest manufactory of the kind in the world.....Mr. Tite has estimated that a work like the Great Pyramid could not now be constructed, with all the aids of modern science, for less than £30,000,000.....It is calculated that in all Europe the male population would, judging from the births, surpass the female by 4,000,000, if this excess were not daily counteracted by the numerous accidents to which the males are exposed, and which materially diminish their numbers.....There are in Salem, Ala., 14 artesian wells, which have an average depth of about 400 feet.....Insurance on ships was first practiced in the reign of Cæsar in the year 45. It was a general custom in Europe in 1194. Insurance offices were first established in London, in 1667.....Books of astronomy and geometry were destroyed, as infected with magic, in England, under the reign of Edward VI. in the year 1552.....Banks were first established by Lombard Jews in Italy. The name is derived from banco (bench), benches being erected in the market places for the exchange of money &c. The first public bank was at Venice, about 1550. The bank of England was established in 1693. In 1699 its notes were at 20 per cent discount.....Book-keeping was first introduced into England from Italy by Peele in 1556. It was derived from a system of algebra, published at Venice, by Burgo.....Notaries public were first appointed by the fathers of the Christian church, to collect the acts and memoirs of the martyrs in the first century.....The administration of the oath in civil cases is of high antiquity. See Exodus, xxii., 10. Swearing on the Gospels was first used in 528. The oath was first administered in judical proceedings in England by the Saxons in 600. The words, "So help me God, and all saints," concluded an oath till the year 1550.

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MACHINE FOR WIRING BLIND RODS.

The annexed engravings illustrate a machine, such as we occasionally have the pleasure of describing, which shows that it was contrived by a man who was familiar with the various mechanical motions, and who had a faculty for combining them judiciously to produce the several effects which he desired. It is made for the purpose of inserting the little wire staples in the rods of window blinds.

The inventor has two patents; one for the staples, and the other for the machine by which they are inserted. The staples are illustrated in Fig. 4, *a* representing the flat side, and *b* the edge. They are made of about No. 18 iron wire, and are pointed, flattened and serrated or grooved across the flat sides to make them hold firmly in the wood, into which they are inserted with their flat sides parallel with the grain.

BOARDMAN'S MACHINE FOR WIRING BLIND RODS

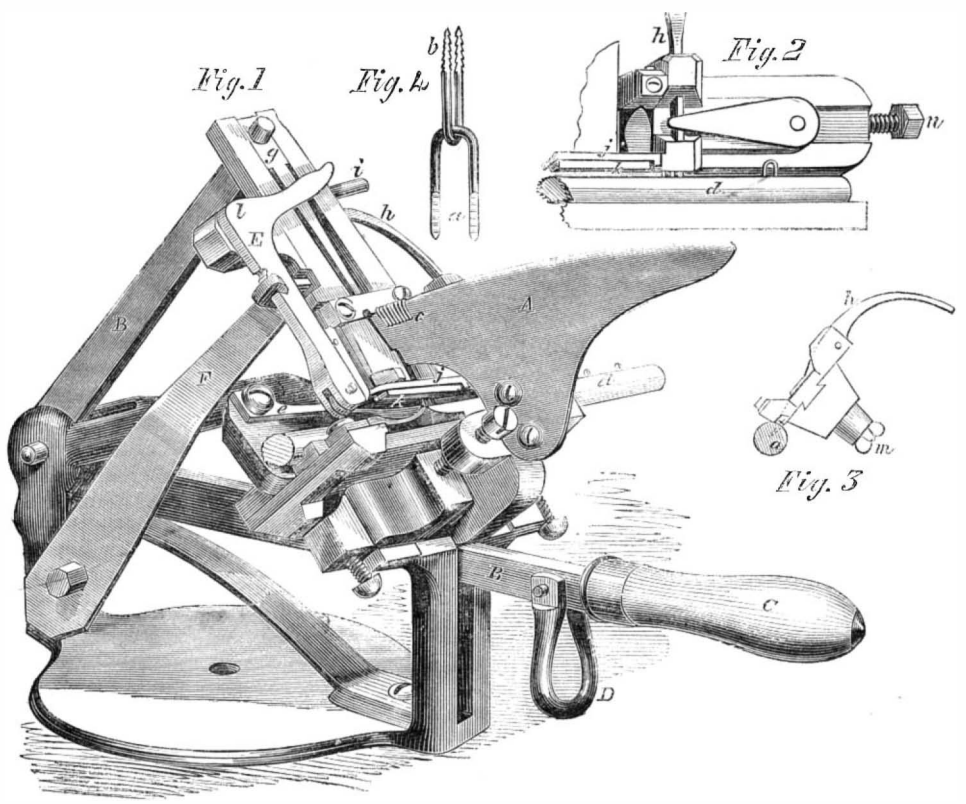


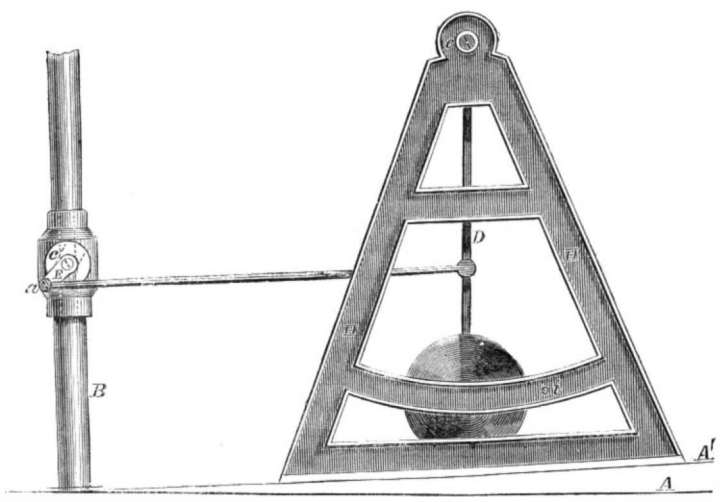
Fig. 1 is a perspective view of the machine; and Figs. 2 and 3 are sections of different parts. The staples, *c*, are placed upon the slide, A, and the wooden rod, *d*, which is destined to receive them, is pushed into the groove, where it is firmly held by the spring, *e*. The V-shaped lever, B, which works upon the fulcrum, *f*, is pushed down by the handle, C, or by a strap in the link, D, connected with the treadle, carrying down the slide, *g*, along its oiled ways. The staples, *c*, slide by their own gravity down the upper inclined edge of the plate, A, and the lower one drops off the end of this edge, and is held by a light spring pressing against it from the back of the machine through a narrow slit in the ways. The slide, *g*, has a shoulder upon its backside which presses away, as it comes down, the light spring just spoken of, allowing the wire to fall fair into the ways below the square end of the slide, which, as it continues its course, carries down the wire and presses it into the rod.

During the operation above described, the rod is held precisely in its place longitudinally by the next preceding staple resting against the side of the lower end of the lever, *h* (Fig. 3). It will consequently be necessary to tilt the lower end of lever, *h*, away from the staple before the rod can be fed along for another wire. For this purpose the pin, *i*, is fastened firmly to the lever, B, at such a point that it may strike the upper end of lever, *h*, after the wire begins to enter the rod. To feed the rod along for another staple, the flat rod, *j*, which slides along the guide, *k*, is jointed to the lower end of the elbow, E, which works upon the fulcrum, *l*. As the lever, B, descends, it strikes the horizontal arm of the elbow, E, and thus draws along the flat rod, *j*, out of the way of the descending staple. After the staple is inserted, a lip upon the lower side of the rod, *j*, at its end, is brought against the staple; and, as the rising of the lever, B, releases the elbow, E, the stiff spring, F, restores the elbow to its place, thus pushing along the rod, *d*, until it is stopped by the staple coming against the side of the lower end of the lever, *h*. It will be seen that this feeding-arrangement places the staples at the same distance apart with great precision. This distance is varied for different sized blinds by sliding along the block in which the lever, *h*, is fastened. This block is held in place by the set screw, *m*; and to adjust it with greater accuracy, the regulating-screw, *n*, is put into the end of the guide, and, being turned in to the proper depth, the set screw, *m*, is brought against its end.

The patent for this machine was granted Sept. 1, 1857, and the patent for the wire staples, March 30, 1858. The inventor is Byron Boardman, of Norwich, Conn. Persons desiring information regarding the purchase of rights may address C. B. Rogers & Co., of the above place. The machines are now on sale at the stores of all the dealers in the "Fay" machines for carpenters and builders.

CATHCARTS' MARINE GOVERNOR.

In the SCIENTIFIC AMERICAN of Oct. 22d, we gave the substance of a paper on the subject of steam governors, read before the Institution of Engineers in London, by Peter Jensen of Sweden. Mr. Jensen in his paper confirms the opinion which we have repeatedly expressed, in regard to the great importance of furnishing the marine engine with a practicable self-acting governor. When a side-wheel steamship is rolling in a heavy sea, at one moment upon an even keel, with both wheels resisting alike, and at the next with one wheel in the air, and the other submerged almost to its center, if the whole tremendous power of the great engine is allowed to exert its full force upon the the shaft, no conceivable strength of shaft and frame-work can resist the varying strain. Accordingly, it is customary in such times to station a man at the valve, and have the steam reduced as the vessel rolls one side down, and let on again as she returns to an even keel. Several efforts have been made to replace the man at the valve, by some device connected with the ship or with the machinery which should be less expensive than a man, and more absolutely certain in its operations. The devices which we have seen hitherto have been more or less clumsy, complicated, or otherwise objectionable, but the one which we here illustrate is certainly extremely simple, and it appears as if it must work; this however, will be proved by proper trial.



CATHCART'S MARINE GOVERNOR.

It consists simply of a pendulum attached to a valve in the pipe, which leads from the boiler to the cylinder. In a side-wheel steamer, the pendulum is placed to swing athwart ships. In the engraving, A, represents the deck of the vessel; D, the pendulum; H H, the frame which supports it; B, the pipe leading from the boiler to the cylinder; C, a valve in said pipe; E, a crank on the axle of the valve; *a*, a pin by which the crank is attached to the rod which forms the connection between the valve and the pendulum. The cut represents the position of the apparatus when the deck is inclined by the rolling of the vessel, the pendulum being swung to one side of the frame, and the valve partly closed, the steam consequently being nearly cut off, and the strain on the shaft, while one wheel is nearly out of water being correspondingly diminished. When the vessel resumes its position on an even keel, the pendulum returns to the middle of the frame, the valve is fully opened and the whole power of the engine is again thrown upon the shaft. By varying the length of the pendulum rod, or by attaching the connection rod at other points on the pendulum rod, the amount of opening and closing of the valve may be adjusted at pleasure. In propellers the pendulum is so hung that it may swing fore and aft the vessel, as the propeller is thrown out of water by the pitch of the ship, instead of the roll.

This most simple of marine governors was invented by James L. Cathcart, of Georgetown, D. C., who has secured patents in England and France, as well as in this country. His American patent is dated April 26, 1859. Persons desiring further information in relation to this invention may address Edward Boyce as above.

DEATH OF AN INVENTOR.

On the 5th of last month a remarkable mechanic and inventor died in this city, and since that period we have learned some details of his unobstrusive but interesting life. James Stewart, well known in this city for the beautiful and neat small lathes which he manufactured for jewellers and others, in his shop on the corner of Elm and Canal streets, was a native of Scotland, and came to Boston in 1828, when 23 years of age. He was a thorough-bred machinist and soon became known for his skill and ingenuity. He was the inventor of the machine for making hooks and eyes, which had previously been made by hand. It was pirated from him by an unscrupulous manufacturer and lawyer, and while it has enriched others, he never obtained the least benefit from it. He removed from Boston in 1835, and lived in this city till the day of his death. He was the inventor of the seraphine which is now in common use, and was an adept in music and musical instruments.

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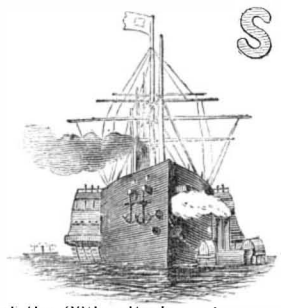
VOL. I., No. 19.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, NOVEMBER 5, 1859.

OCEAN STEAM NAVIGATION.



STEAM navigation, as connected with our foreign commerce, is now attracting some attention from our cotemporaries. The New York *Times*, of the 20th Sept., contained a leader on this subject, and a correspondent ("Nauticus") of that paper, in the issue of the 20th ult. has also expressed some opinions on this question. In a recent issue of the Philadelphia *Evening Journal* there is a long communication from Captain Cram, U. S. Topographical Engineers, who takes for his text the important inquiry—"Shall Americans acquire supremacy in ocean steamship traffic?" It affords us pleasure to witness this drifting of the public opinion towards one of the greatest national questions of the age. From the progress of foreign steam navigation during the past ten years, the question at issue seems rather to be—shall Americans be wiped out from ocean navigation altogether? On page 285, Vol. XII, SCIENTIFIC AMERICAN, we directed the attention of our merchants to the great increase of foreign steamships in Atlantic navigation, and clearly pointed out the fact that within a few years they had driven one third of the trade once carried on in American vessels from the ocean. We exhorted them to make an effort to redeem their lost and decreasing business, warning them that, unless they did so speedily, they would become "weaker and less able for the struggle, while their rivals would be growing stronger, increasing in wealth, power and influence." Our warning passed unheeded at the time, but now it is fully appreciated. Our steamers have been nearly driven from the ocean, and were our coasting trade open to foreign competition, in all likelihood, we would lose that also.

What shall be done, either to maintain our present position or retrieve our lost commerce? We cannot stand still; to remain effortless is to go backward. Some fears seem to have been engendered in regard to a new era in steam navigation being about to be introduced by the *Great Eastern*; and notions are entertained by many that we must commence to build steamers of mammoth size to prevent our entire commercial immolation. Such fears are groundless; we have already lost our trade, but not by competition with mammoth foreign vessels. Captain Cram considers that an improvement in the construction of ocean steamers "is absolutely essential to secure a paying traffic;" while, on the other hand, "Naucus," in the *Times*, asserts that the Collins steamers are superior in comfort, beauty and speed to the *Persia*, and that "in every department of art or mechanism we have improved upon our foreign rivals." Here is an evident contradiction of opinions. We believe that our foreign rivals have improved upon us, or they assuredly would not have driven our steamers from the ocean. This is not the time for boasting of what we have done, or what we can do, but of speaking by deeds. We have lost and are still losing our ocean carrying-trade, principally from the competition of a class of steamers the efficiency and economy of which our people do not yet appreciate; we mean iron screw-propellers. Nearly the whole German, much of the English, and the entire Scotch trade is now carried on with our country by such steamers, They are built on the river Clyde, and cost much less than wooden vessels, and are very economical of the steam power. On page 242, of the present volume of the SCIENTIFIC AMERICAN, we gave an illustration of the method of constructing iron ships, by Mr. Sneeden, of Greenpoint, near this city; and we were happy to chronicle the sagacity of Commodore Vanderbilt being turned in this direction. As this is the quarter to which we must look for success, we recur to the subject at the present time, because, since we published the article referred to, some of our cotemporaries have touched upon the subject, and they seem to be at sea in the matter, without chart or compass to guide them. It was stated in one of our Buffalo (N. Y.) cotemporaries, last week, that R. Germain, of that city, had made a discovery in the construction of vessels, whereby steamers could be run at the rate of 100 miles per hour, and at one half the present cost for navigating them. We have an intense admiration for great deeds, but a profound contempt for great words merely. If Mr. Germain can only build a steamer that will obtain an average speed on the ocean of but 20 miles per hour, without any decrease of cost in navigating it, he is the very person who will eclipse our foreign rivals completely. At such a speed he can make a voyage from New York to Liverpool in six days and six hours, just about one half the average time of common steamships. Let him first do this before he attempts his 100 miles per hour trip; and if he succeeds, he will certainly deserve, and no doubt secure, both fame and fortune. We are far from doubting that great improvements will yet be achieved in the construction of steamships, but at present we have most confidence in iron hulls and screw propellers for regaining our lost commerce.

ROBERT STEPHENSON.

The ink had scarcely become dry in noticing the decease of Brunel, when news arrived that Robert Stephenson, another great English engineer of world-wide celebrity, had also been carried to "the narrow home appointed for all living." In regard to mental qualifications, and the magnitude of the engineering works which he projected and successfully carried out, no engineer of ancient or modern days was his equal. He was the son of the renowned George Stephenson, justly called "The Father of the Railway System," and was born on Dec. 16, 1803, at Wilmington Quay, on the banks of the river Tyne; consequently, at his death, which took place on the 12th ult., in London, he was only 55 years of age. He was therefore a comparatively young man in years, but old in great deeds, as he has left behind him many mighty and enduring monuments, which will carry his name down to distant generations. When the subject of this memoir was born, his father was in very humble circumstances, being but a brakesman or engine-tender of a coal mine. He was an only son, and lost his mother when but a year old. His father, "old George," devoted earnest and affectionate attention to train him up in habits of industry and morality, and was eminently rewarded for his efforts. Robert received a good practical education, and served an apprenticeship as "under-viewer" in a colliery at Killingworth, where he became distinguished for his mechanical genius and devotion to study during his evening hours. He lost no opportunity of attending mechanical and chemical lectures in mechanics' institutes; and he faithfully sought every opportunity to improve his mind. When his father's circumstances in life became improved, Robert was sent to the University of Edinburgh for one session, where he took the first prize in mathematics, and otherwise distinguished himself. After this, he became an apprentice in a locomotive-shop; and as his father increased in fame and wealth, the son also rose to distinction, with the railway system, as the greatest and best practical civil engineer in the country. His projects were grand and vast; and in this respect he was the equal, if not the superior, of Brunel. In one important feature, he was by far his superior. Being a practical mechanic, as well as an educated civil engineer, he was perfectly familiar with all the *minutæ* of his undertakings; hence, he was always successful—he never failed in anything he undertook to perform. He was engineer of the great viaduct over the river Tweed, at Berwick, and the tubular bridge—the first in the world—over the Menai Straits, which was opened in 1850. He projected this kind of bridge; but William Fairbairn made the experiments which determined the form, and he also wrought out the details of its construction. Robert Stephenson was also engineer of lines of railway in Belgium, Norway, Italy, Switzerland and Egypt, and it is not long since he completed the 140 miles of railway between Cairo and Alexandria, with two tubular bridges. Besides these labors, he has been a member of Parliament since 1847. In 1855, he paid off a debt of $15,000 for the Newcastle Literary and Philosophical Society. He was an honorary but active member of the London Sanitary and Sewerage Commissions, a Fellow of the Royal Society, a member of the Institution of Civil Engineers since 1830, and president during the years 1856 and 1857. He received a great gold medal of honor from the French Exposition d'Industrie of 1855, and is said to have declined an order of knighthood in Great Britain. He was also the author of a work "On the Locomotive Steam-engine," and another "On the Atmospheric Railway System." He designed the Victoria tubular bridge, now in the course of construction over the St. Lawrence at Montreal, which, when completed, will be the greatest work of the kind on the globe. He was a man of noble impulses, and was the only person in England owning a yacht who had the courage to try a race with the *America*, in which contest he was honorably defeated. We have devoted this much space as a brief memoir of this truly great man. His public life was a grand march from a poor boy to the highest position in the world as a civil engineer. As an example to young men, his whole life, professional and private, is worthy of imitation. The London *Times* passes a high eulogium upon him, as follows:—

"If his loss will be felt severely in his profession, it will be still more poignantly felt in his large circle of friends and acquaintances, for he was as good as he was great, and the man was even more to be admired than the engineer. His benevolence was unbounded, and every year he expended thousands in doing good unseen. His chief care in this way was for the children of old friends who had been kind to him in early life, sending them to the best schools, and providing for them with characteristic generosity. His own pupils regarded him with a sort of worship. A man of the soundest judgment and the strictest probity, with a noble heart and most genial manner, he won the confidence of all who knew him. Without a spark of professional jealousy in his own nature, he was liked by all his fellow engineers. He has passed away, if not very full of years, yet very full of honors—the creator of public works, a benefactor of his race, the idol of his friends."

LIGHTNING-CONDUCTORS.

Our attention has been solicited by an intelligent correspondent, well-versed in electrical science, to an article on the above subject which appeared in the New York *Tribune* of the 22d ult. A correspondent—Joseph Tait, of Lee county, Iowa—had communicated with our cotemporary, asking whether "lightning-rods were of any use?" Mr. Tait states that he had a lightning-rod on his house, and yet it was struck by lightning on the 18th of September, killing a dog, and sending himself and "six little Taits sprawling over the floor." The lightning is stated to have "come down the rod, punched a hole in the cellar wall, and, after doing sundry damages, went out of the cellar window." This escapade of the lightning having rather knocked the faith out of him about lightning-rods, he wrote to the *Tribune* for light on the subject, and was answered as follows:—

"A hundred, at least, of just such cases have come to our knowledge, and we do not believe that one lightning-rod in a thousand is of any more use, as a protector of the building, than the nails which hold on the shingles. Did it never occur to the minds of advocates of lightning-rods, that the heads of all nails, while new and bright, are just as likely as the points of their rods to attract electricity? It is barely possible that a rod well made, well insulated, and well set in the ground, may serve to conduct a portion of the electricity above the house to the ground, should there be no great excess of it in the atmosphere; but whenever there is enough to produce an explosion, it will probably produce just such results as Mr. Tait describes—the dog will be killed, and 'things knocked about promiscuously.' If the readers of the *Tribune* think we are mistaken, they will continue to invest the cost of 'a protector' with the first lightning-rod pedlar that comes along, 'working upon the fears of the women folks.'"

This is an important question. The press, which assumes the office of teaching the public in science, will do great injury if it is not capable and reliable. If lightning-rods are protectors from the injurious effects of disruptive discharges of atmospheric electricity, then the

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above opinions of the *Tribune* are calculated to do evil; if not, the public should be made aware of the fact. So far as the science of the question is concerned, our cotemporary is evidently out of his sphere; he does not know the nature of the lightning-rod. Its function is simply that of a conductor—not an attractor. It is carried up to such an elevation above a building that it may tap the electric cloud, and conduct it silently to the earth, in order to prevent it striking the non-conducting part of the building. To do this perfectly, it must be continuous from point to base, and form a perfect connection with the moist earth below If this connection is not perfect, of course the rod cannot perform the functions of a conductor, and a disruptive discharge may take place, as in Mr. Tait's case. There is abundant evidence for concluding that all houses that have been struck with lightning, when furnished with rods, have had their conductors imperfectly connected, either in the sections of the rod or in the earth. The rod should extend down several feet in the ground, and have a large plate or bar of metal at the base, according to the arrangement of the electric circuits at all the telegraph stations. If a house is built on a dry and sandy situation, it is all the more necessary to be careful in extending the conductor deep into the earth, where it will meet with moist soil. If all lightning-rods of the common size were thus carefully put up, we would seldom hear of such cases as the one referred to.

As a question of fact, we have solid testimony regarding the utility and efficiency of lightning-rods as protectors. In a work of Captain R. B. Forbes, of Boston (who has done so much to bring the subject to the attention of our naval authorities), it is stated that, in the British navy, ships furnished with conductors have escaped without injury, in severe thunder-storms, by very heavy flashes being carried off by "Harris' conductors." In Lucius Lyons' work on lightning-conductors, there numerous cases cited of the efficiency of lightning-rods, and the most eminent scientific *savans* have lent their names to this side of the question. The ignorant idea that lightning-rods attract lightning has done more to prevent the application of electric conductors to ships and buildings than anything else. It is an erroneous and unscientific notion; and that it should be promulgated from the daily press, at the present day, is anything but creditable to its intelligence.

AMERICAN INDUSTRY ABROAD.

Our countrymen, as industrious civilizers, may now be found in every quarter of the globe, occupying some of the most important situations. In the government rifle factory, at Enfield, England, the largest for small arms in the world—where 1,600 stand of arms are turned out weekly—most of the machinery is of American invention. Quite a number of the machines were made by the Ames Manufacturing Company, at Chicopee, Mass.; some at Windsor, Vt., by Robbins & Lawrence; and some at Col. Colt's factory, at Hartford, Conn. The practical personal superintendents at Enfield are two Americans, namely, James H. Burton, chief engineer, and Orramel Clark, chief of the stock department. These gentlemen were long and honorably connected with our own armories; now they are as highly esteemed and rewarded by the mother country, where the value of American genius is being fully recognized.

In Russia, American engineers have long held important situations, especially in railroad engineering, and Majors Whistler and Brown have held the highest positions in the government employ. The names of Winans, Harrison, Kirk, and others of our American machinists are more familiar in Moscow than in New York. And now, away in a distant part of the Russian dominions in Asia, on the Amoor river, which flows into the Pacific, opposite the northwestern shores of our continent, our countrymen are also busy as pioneers of improvement and industry. At Nicolaefsk, situated on the northern bank of the Amoor, and containing some 3,000 inhabitants, the government has erected a large machine shop and foundry, the works for which (of every kind) were made at Philadelphia, Pa., at a cost of over $300,000; and there are now over five hundred tuns of American-made machinery landed and under cover, awaiting the construction of the buildings, on which great numbers of Russian laborers are employed. The greatest favor is shown to Americans, whose enterprises are encouraged, and who fill every position in the place requiring mechanical skill. A company of Americans have obtained the privilege of navigating the river, and they have recently built a small steamer of light draught capable of penetrating 2,000 miles into the interior. They intend to trade with the natives, exchanging American goods for the products of that country—furs, tallow, hides, &c.

If we now turn our eyes to old Japan, which four years ago was hermetically sealed against all foreigners except the Dutch, we find our countrymen there also, snugly settled, and doing a smart business. By recent accounts, one of them has discovered a very rich copper mine; and the emperor, king, or whatever else his title may be, has granted him the privilege, it is said, of working it by paying a very small tax. That island is yet destined—if the people are dealt with in a proper manner—to promote a large trade with our country. It is rich in minerals, and rare vegetable products. Gold is found in various localities, and copper is abundant. Iron abounds in various parts of Japan, the mines of which are extensively worked, much more so at present than those of copper. By our treaty, coals, zinc, lead, and tin are to be exported at a duty of five per cent. The vegetable productions of Japan that are most probably destined to become articles of commerce are camphor, vegetable tallow, drugs, isinglass, &c. Of all the nations of the East, the Japanese are the most susceptible to civilizing influences, and they are far in advance of their ancient neighbors, the Chinese, in obtaining a knowledge of other nations.

In Brazil, a railroad is building of a somewhat difficult character, on seventeen miles of which there are thirteen tunnels, all being constructed by Americans. E. D. Muhlenberg, of Pennsylvania, is one of the contractors, and R. Harvey another. In Chili, our locomotives have earned a high character in fair competition with those from the mother country; and in whatever direction we look, it is gratifying to our honest national pride that, in the peaceful and industrial pursuits of life, our countrymen are exercising such an honorable influence.

EXPLAINING THINGS.

Nothing can be *fully* explained. In every department of knowledge, if we go a few steps from that which is muscle bone the surface, we come to absolute mystery which no man can explain. Ask the most learned surgeon to explain the motion of the hand. He tells you that the hand is at one end of a bone which has a joint at the other end; that a band of flesh, which he calls a muscle, is attached at one end to this bone and at the other end to another bone beyond the joint, in such a way that, when the muscle contracts, the bone moves upon the joint and carries the hand along A nerve leads from the brain to the muscle and carries the influence by which the will acts upon the muscle. If you ask the surgeon how the brain acts upon the nerve, and the nerve upon the muscle, he can tell you no more than the smallest child or the most ignorant savage can. What the nervous influence is—whether it is a fluid or a vibration, or whether it is something different from either of these—is known to God, but it is not known by any of the children of men.

We see a pebble fall to the ground, and we are told that it is drawn by the attraction of gravitation; but what the attraction of gravitation is—how it reaches up from the earth and takes hold of every atom of the pebble and pulls it down—is to us an unfathomed mystery. There must be some material connection between the stone and the earth. This was so plain to Sir Isaac Newton that he regarded the person who denied it as incapable of comprehending the proposition. But if we pass our hand between the stone and the earth we cannot feel any substance, we cannot see any with our eyes, and yet we know that there is some matter interposed between the two bodies which draws them together with tremendous power. We know some of the properties of gravitation; we know that it draws all ponderous bodies together with a force proportioned to the quantity of matter which they contain, and in inverse proportion to the square of the distance between them. But what its essence is, and how it takes hold of matter, no human being has ever learned.

Oxygen is more ready to enter into chemical combination with zinc than it is with copper, but why this is so not all the chemists in the world can tell. Vast indeed is the amount of knowledge in regard to chemical affinity; what substances exhibit its power with the greatest energy, how it manifests itself in thousands of curious and complicated and wonderful operations, all in accordance with fixed and infallible laws, have been learned by patient and laborious study of many among the greatest intellects of our race; but what the essenc of chemical affinity is, or how it takes hold of the atoms which it moves, has never been ascertained.

If we attempt to understand thoroughly any fact whatever which comes under our observation, we shall find that a few steps will bring us to the dark gulf of profound and unfathomed mystery. Carlyle says: "Sooty Manchester, it too is spanned by the skyey firmament, and there is Life in it, and Death in it; and it is every whit as unimaginable, as inconceivable, as the oldest Salem or prophetic city!"

TEA.

One of our correspondents (B.) furnishes us with the following statistics in regard to tea:—

"This plant furnishes the most important beverage, not alone of the English nation, but one half of the whole people on the globe—that is, 500 millions of persons. An immense extent of land is devoted to the cultivation of this plant in China, in which country and Japan no less than 500 millions of dried tea are annually consumed. It requires 3 pounds of fresh tea leaves to make 1 pound of the drug. About 80 million pounds are exported annually to the following countries:—England, 40 millions; United States, 28; Russia, 7; Holland, 2½; Germany, 2¼; France, half a million. The first tea brought into Europe was by the Dutch, in 1600, and for 64 years they furnished England with all she required. In 1780 the consumption in England was 3 million pounds per annum; in 1802, 20 millions; now it is no less than 40 millions. This plant is now successfully cultivated in Java and Sumatra (Dutch possessions), and in Assam and Ceylon (English)."

As a supplement to the statistics of our correspondent, we will add that land-carried tea and that carried in ships formed the subject of a conversation at the recent meeting of the British Scientific Association. It is well known that an opinion has become somewhat fixed in the public mind, regarding tea carried on sea being inferior to that transported by land. It is considered that its flavor and quality are injured in the former case; but how, we never found one who could explain. As all the tea of Russia is carried overland, it is asserted that it is superior to that which we obtain; but Sir John Bowring, who has lived so many years in China, states that this is not the case. This idea of superiority in land-carried tea has been promulgated by the Russian government, because sea-carried tea is prohibited in that country, and because as good tea can be bought in England for 8s. sterling per pound as in Russia for 25s. He believes that tea loses none of its excellent sanitary qualities by being carried in ships; and in this opinion we think he is correct.

COAL OIL LAMP

Drake's improved lamp, illustrated on page 280 of the present volume of the SCIENTIFIC AMERICAN, is intended expressly for coal oil, being adapted to both the heavy and light varieties. The extra wick of soft cotton carries up the heavy oil and, by affording a copious supply to the burning wick, prevents that from charring. The wick being lighted below the slit in the cap, one current of warm air comes in contact with the blaze within the cap, and another after it issues through the orifice in the top between the cap and the chimney, thus securing a complete consumption of the oil. The inventor says that this lamp will burn coal oil of the various qualities in the market without smell or smoke, and will produce a satisfactory light from any of them.

LITERARY LARCENY.—An extraordinary statement is in circulation in London respecting the "Pilgrim's Progress," namely, that this celebrated work was *not* written by John Bunyan, but that the entire story is made up from an ancient manuscript. Miss Catherine Isabella Curt has published a translation, from a French manuscript (in the British Museum), of the "Pylegremage of the Sowle," by G. de Geideville, a churchman who flourished in the fifteenth century. A translation of the original work was printed by Caxton in 1483, and Bunyan's "Pilgrim's Progress" is said to be nearly a verbatim copy of that extremely rare book.

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FOREIGN SUMMARY—NEWS AND MARKETS.

Some very interesting papers were read before the late annual convention of the British Scientific Association at Aberdeen. Dr. Odlin read a paper on "Bread-making," by raising it with carbonic acid gas generated from chalk, instead of producing the raising by common fermentation. In the discussion which ensued, it was contended by one member that bread raised with the bi-carbonate of soda and muriatic acid was as good as any other, and it was more readily made. Dr. Daubeny said that muriatic acid sometimes contained a little arsenic, and was therefore injurious; and he warned them not to put any faith in "Johnston's Chemistry of Common Life," in regard to its statements of arsensic being taken in small quantities with impunity by the girls of Tyrol to improve their complexion; the reverse of this was the fact.

Mr. Lindsay, of Dundee, read an interesting paper on the subject of some experiments in transmitting electric effects across water without the aid of transverse wires. He commenced a series of experiments in electricity in 1831, and made another set in 1844 in telegraphing across water without wires first, and then by means of two uninsulated wires; and finding the latter method much more powerful, he preferred it, and telegraphed in that way through several ponds in Dundee. In 1852, he resumed experiments without transverse wires, on a larger scale, at Portsmouth, and succeed in crossing more than a quarter of a mile. More recently he had made additional experiments, and succeeded in crossing the Tay where it was three-quarters of a mile broad. His method had always been to immerse two plates or sheets of metal on the one side, and connect them by a wire passing through a coil to move a needle; and to have on the other side two sheets, similarly connected, and nearly opposite the two former. Experiments had shown that only a fractional part of the electricity generated goes across, and the quantity that goes across may be increased in four ways: first, by an increase of battery-power; second, by increasing the surface of the immersed sheet; third, by increasing the coil that moves the receiving-needle; fourth, by increasing the lateral distance. Where the lateral distance could be got, he recommended increasing it, as, by that means, a smaller battery was requisite. In telegraphs by this method to Ireland and France, abundance of lateral distance could be got; but for America, the lateral distance in Britain was much less than the distance across. According to a calculation he had made, he thought a battery of 130 square feet, immersed sheets of 3,000 square feet, and a coil of 200 pounds weight, were sufficient to cross the Atlantic, with the lateral distance that could be obtained in Great Britain.

The following are some of the appropriations made to continue scientific experiments by the committees during the next year: for Kew Observatory, £500; chemical science, £90; geology, £60; zoology and botany, £100; physiology, £20; and mechanical science, £160.

It was also recommended that a committee be appointed to continue the inquiry into the performance of steam vessels, to embody the facts in the form now referred to the association, and to report proceedings to the next meeting; that the attention of the committees be also directed to the obtaining of information respecting the performance of vessels under sail, with a view to comparing the results of the two powers of wind and steam, in order to ascertain their most effective and economical combination; and that £150 be placed at their disposal for this purpose. It was also recommended that the Committee on Patent Laws be re-appointed for the furtherance of the interests and rights of inventors, and for proposing such means as may tend to necessary reform in the English patent laws. These recommendations were agreed to.

William Fairbairn, F.R.S., read a paper on the subject of experiments to determine the efficacy of continuous and self-acting brakes for railway trains. On this subject, the most important communication which had been made was the report of Tolland to the Railway Department of the Board of Trade. The brakes with which Colonel Tolland experimented were those which, as improvements on the common hand-brakes, have commanded most success. Similar experiments were afterwards made on similar brakes, which he (Mr. Fairbairn) was called on to carry out by the directors of the Lancashire and Yorkshire Railway. The general result of the whole experiments show that a train could be stopped by Fay & Newall's brakes, at a velocity of 20 miles an hour, in 23.4 yards; at 40 miles an hour, in 93.8 yards; at 50 miles an hour, in 146.8; and at 60 miles an hour, in 311.5 yards.

The *Great Eastern* has made her trial trip; and, if the newspaper reports are correct, it seems to have been quite successful. She was out 48 hours between Portland and Holyhead, the run being over 550 miles. The average rate of speed for the whole trip is stated to have been over 13 knots; though, during the greater part of the time, the engine did not go more than at half-speed, the paddles averaging 10 and the screw 8 revolutions per minute, when working at a pressure of 20 pounds. The greatest speed attained was over 14¼ knots, or nearly 17 miles, per hour. This was accomplished without any special exertions on the part of the engines, but a considerable quantity of canvas was spread. The weather during the trip was squally, and at times a long heavy ground swell was experienced, causing, according to some authorities, a good deal of pitching and rolling on the part of the vessel. The ship was tried (after some demur by Mr. Scott Russell) both under screw and paddle engines, united and singly, and on both occasions with successful results. The correspondent of the London *Times*, on board the ship, writing before the run to Holyhead, says that it is more than probable that the ship will not leave England during the winter, and that Southampton will probably be her winter quarters. As a contrast to the *Great Eastern*, a little vessel, the *Helen Cowran*, a screw steamer of 18 tuns, built at Dumbarton, on the Clyde, is about to be sent across the Atlantic. A small screw, named the *Little Lucy*, of 30 tuns, made the voyage some time since with great success, and this has determined her proprietors to try the experiment with a still smaller vessel. The navigation of this vessel has been entrusted to Captain Breckon, under whose able direction, after a remarkably rapid passage, the *Little Lucy* was handed over in safety to the company at Bahia.

American knife-sharpeners have been introduced into England, and applied to sharpen scythes in place of raffles and stones. As modified for use, the scythe-sharpener consists of an iron handle about 10 inches long, and three-quarter inch iron, with a fork at one end about three inches in length. Fixed to the extremity of each diverging finger is a piece of polished steel an inch square, with beveled edges, and placed at such an angle as to fit the edge of the scythe. The sharpener is held in the right hand, and the blade passed straight and square between the plates, drawing the sharpener from the heel to the point of the blade until it is brought to an edge.

The celebrated London bell, called "Big Ben of Westminster," about which the cockneys made such an ado, as being the greatest and sweetest-toned article of the kind in the world, is now silent. Its whistle is cracked, and it has become an inglorious memento of incapacity on the part of its founder.

We omit the usual table of foreign metals this week, because the changes are not worth noticing. England was never before so prosperous in her manufacturing interests as during the past six months.

New York Markets.

COAL.—Anthracite, $4.50; Sidney, $5; Liverpool cannel, $9.34; house, $7.43 per tun.

COPPER.—Refined ingots, 22½c. per lb.; sheathing, 26c.; Taunton yellow metal, 20c.

CORDAGE.—Manilla, per lb., 8½c.

COTTON.—Ordinary, 8¾c. a 9c.; good ordinary, 9⅝c. a 10c⅛.; middling, 11⅛c. a 11⅞c.; good middling, 12⅛c. a 12⅞c.; middling fair, 12½c. a 13¼c.

DOMESTIC GOODS.—Shirtings, bleached, 30 a 34 inch per yard 7c. a 8½c.; sheetings, brown, 36 a 37 inch per yard, 5½c. a 8¾c.; sheetings, bleached, 36 inch per yard, 7¼c. a 15c.; calicoes, fancy, 6c. a 11c.; cloths, all wool, $1.50 a $2.50; cloths, cotton warp, 85c. a $1.37; cassimeres, 85c. a $1.37½; satinets, 30c. a 60c.; flannels, 15c. a 30c.; Canton flannels, brown, 8½c. a 13c.

FLOUR.—State extra brands, $5 a $5.10; Ohio fair extra, $5.55 a $5.65; Ohio good and choice extra brands, $5.75 a $6.75; Michigan, Wisconsin, Indiana, &c., $5.10 a $5.40; Genesee, extra brands, $5.50 a $7; Missouri, $5 a $7.50; Canada, $5.50 a $6.40; Virginia, $6.50 a $7.50.

HEMP.—American undressed, $140 a $150; dressed, from $190 a $210. Jute, $90 a $95. Italian, $275. Russian clean, $200 per tun. Manilla, 6½c. per lb.

INDIA-RUBBER.—Para, fine, 60c. per lb.; East India, 45c. a 52c.

INDIGO.—Bengal, $1 a $1.60 per lb.; Madras, 75c. a 95c.; Manilla, 60c. a $1.15; Guatemala, $1 a $1.10.

IRON.—Pig, Scotch, per tun, $23.50 a $24; Bar, Swedes, ordinary sizes, $87 $90; Bar, English, common, $43 a $44; Sheet, Russia, first quality per lb., 11¾c. a 11⅞c.; Sheet, English, single, double and treble, 3 1-16c. a 3⅞c.; Anthracite pig, $24 per tun.

IVORY—Per lb., $1.25 a $1.80.

LATHS.—Eastern, per M., $1.75.

LEAD.—Galena, $5.70 per 100 lbs.; German and English refined, $5.55 a $5.60; bar, sheet and pipe, 6c. a 6¼c. per lb.

LEATHER.—Oak slaughter, light, 33c. a 34c. per lb.; Oak, medium, 33c. a 35c.; Oak, heavy, 31c. a 33c.; Hemlock, slaughter, light, 23c. a 23½c.; Hemlock, medium, 23c. a 24c.; Hemlock, heavy, 22½c. a 23c. Upper Leather.—Rough, oak, light, 31c. a 33c.; Oak, heavy, 30c. a 31c.; Oak, Southern tan, 30c. a 31c.; rough Hemlock, good light, 26c. a 27½c.; Hemlock, good heavy, 24c. a 26c.; Hemlock, polished, 14c. a 15c.; Hemlock, buff, 15c. a 18c. Cordovan, 50c. a 60c. Morocco, per dozen, $18 to $20. Patent enameled, 16c. a 17c. per foot, light Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LUMBER.—Georgia. yellow pine, $26 per M feet; eastern Spruce and Pine, $13.50 a $14.

NAILS.—Cut at 3c. a 3⅜c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14½c.

OILS.—Linseed, city made, 57c. per gallon; linseed, English, 57c.; whale, bleached winter, 58c. a 60c.; whale, bleached Fall, 58c.; sperm, crude, $1.35; sperm, unbleached winter, $1.40; sperm, unbleached Fall, $1.35; lard oil, No. 1 winter, 90c. a 95c.; refined rosin, 30c. a40c.; camphene, 47c. a 49c.; fluid, 54c. a 56c.

PAINTS.—Litharge, American, 7c. per lb.; lead, red, American, 7c.; lead, white, American, pure, in oil, 8c.; lead, white, American, pure, dry, 7¼c.; zinc, white, American, dry, No. 1, 5c.; zinc, white, French, dry, 7¼c.; zinc, white, French, in oil, 9½c.; ochre, ground in oil, 4c. a 6c.; Spanish brown, ground in oil, 4c.; Paris white, American, 75c. a 90c. per 100 lbs.; vermillion, Chinese, $1.12½ a $1.22; Venetian red, N. C., $1.75 a $2.31¼ per cwt.; chalk, cash, $4.75 per tun.

PLASTER-OF-PARIS.—Blue Nova Scotia, $2.75 a $2.87½ per tun; white Nova Scotia, $3; calcined, $1.20 per bbl.

RESIN.—Common, $1.60 per 310 lbs. bbl.; No. 2, &c., $1.70 a $2; No. 1, per 280 lbs. bbl., $2.25 a $3; white, $3.25 a $4.50; pale, $5.50.

SPELTER plates, 5c. a 5¼c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

TALLOW.—American prime, 10¾c. to 10⅞c. per lb.

TIN.—Banca, 32½c. a 33c.; Straits, 30½c.; plates, $7.25 a $9.50 per box.

TURPENTINE.—Crude, $3.62½ per 280 lbs.; spirits, turpentine, 46c. per gallon.

WOOL.—American, Saxony fleece, 50c. a 55c. per lb.; American full blood merino, 46c. a 48c.; extra, pulled, 45c. a 50c.; superfine, pulled, 37c. a 41c.; California, fine, unwashed, 24c. a 32c.; California, common, unwashed, 10c. a 18c.; Mexican, unwashed, 11c. a 14c.

ZINC.—Sheets, 7¼c. a 7½c. per lb.

The foregoing rates indicate the state of the New York markets up to October 27th.

BANGOR (MAINE) LUMBER MARKET.—The following is the amount of lumber surveyed from January 1st to October 1st, in 1859, compared with the amount surveyed in the same period of 1857 and 1858:

	1857.	1858.	1859.
Green pine	45,816,829	39,862,857	46,559,411
Dry pine	12,833,708	11,177,727	7,878,165
Spruce	47,753,081	48,021,308	58,079,655
Hemlock, &c.	10,197,449	12,152,133	12,546,064
Total	116,601,067	111,214,025	125,063,295

From one of our correspondents, engaged largely in the sugar manufacture in Louisiana, we learn that there is a short crop this year—275,000 hogsheads. Some planters have commenced grinding the grain, as is usual at this season of the year; soft and small yield.

The export of cotton from the 1st to the 25th of October, was 11,689 bales, against 9,237 for the same period last year. Texas is now a large cotton-growing State. The arrivals of cotton at this port last week were: from Texas, bales, 2,561; Georgia, 1,682; South Carolina, 1,371; North Carolina, 184; Virginia, 597; Baltimore, 81. Total, 6,476 bales.

The prices of india-rubber are high. This greatly affects the price of vulcanized rubber fabrics.

The dry goods trade is very dull at present. The auction houses are selling many goods at a sacrifice to reimburse the importers.

HOPS.—The Cooperstown (N. Y.) *Journal* reports first-class hops scarce at 15c. per lb. The quantity of inferior hops, mainly injured by the early frost, is very large, and pressing upon the market.

The steamer *Baltic* lately brought from California a monster gold ingot, which has been exhibited in Wall-street. It weighs 2,251 25-100 ounces, and is valued at $42,581 71.

A SUCCESSFUL INVENTOR.—O. Stoddard, of Busti, N. Y., informs us that he perfected an invention, made application for a patent, received the patent, and sold it for $13,800 cash—all in the space of 92 days! Mr. Stoddard has received nine patents for his inventions, and is now making application for the tenth. He does all his business through the Scientific American Patent Agency. May his shadow never be less!

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WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

IMPROVED OIL.

This invention consists in combining a small quantity of linseed oil with a large quantity of water by means of sal soda or other alkali, whereby a good substitute for linseed oil is produced. This improved oil, we are informed, has been tried in mixing paints at the United States capitol, and found to effect a very great saving and to answer all the ends of pure linseed oil. The alkali effects a chemical union between the water and oil, gives consistency and strength and durability, and so separates the white lead that all necessity of grinding the same is avoided. The inventor is G. W. Slagel, of Washington, D. C., and the patent is assigned to the above and Dr. O. A. Dailey, of the same city.

IMPROVEMENT IN SAFES.

This invention consists in making a safe door with square instead of bevel edges and having grooves formed on the inner face of the door to receive tongues formed on the flange or jamb of the safe, against which the door closes. A tongue and groove are also formed at the back edge of the door or jamb. By this construction of safe the bind, which is experienced when a bevel edge door is used, is avoided, and still the joint between the door and jamb are made water, powder and fire-proof. This appears to be an excellent auxilliary to safes and bank vaults. The inventor is L. H. Miller, of Baltimore, Md.

PIANOFORTE ACTION.

T. S. Seabury, of Stony Brook, N. Y., has an improvement in pianoforte actions, the principal object of which is to allow each or any one of the hammers, and all the moving parts pertaining to it, to be removed from the instrument along with its respective key, for the purpose of examination, adjustment, or repair of the parts, without disturbing any of the other keys or hammers or other parts of the action. The invention consists in pivoting the hammer butt to a post, or its equivalent, that is carried by the key; also in a certain mode of applying and effecting the operation of a jack or fly lever, through which the blow of the hammer is produced, and in a certain improved mode of applying the check.

IMPROVEMENT IN REEFING FORE-AND-AFT SAILS.

Capt. S. Samuels, of the clipper ship *Dreadnought*, so celebrated for her rapid passages between the ports of New York and Liverpool, has a plan for reefing ship's spankers, schooner's main and fore sails, and other fore-and-aft sails of similar character, by rolling them on their booms in such a manner that the boom is free to be worked in the same manner as the booms in common use for such sails. The invention admits of an old sail and boom being used, and can be applied to any vessel at small expense.

QUARTZ PULVERIZER.

The object of this invention is to re-grind the tailings of an ordinary stamping quartz mill, so that the contained gold and quicksilver may be brought in contact and all the gold amalgamated and saved. In using the stamping quartz mill much gold and quicksilver is lost, the great divisibility of the said substances and a lack of proper union, assisted by the presence of sulphate of iron, favoring their escape. The invention consists in the employment or use of a conical grinder in connection with a horizontal oscillating disk provided with annular chambers, the whole being so arranged that the desired object is attained. The inventor is W. H. Howland, of San Francisco, Cal.

MACHINE FOR CLEANING AND OPENING FLOCK.

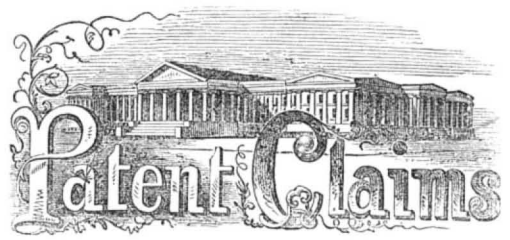
The object of this invention is to obtain a machine whereby all foreign substances may be effectually separated from the flock and the latter opened or its particles distended or loosened, so that it will leave the machine in a light state suitable for use. The invention consists in the employment or use of a metal corrugated cylinder and concave fan, and a cone provided with projecting toothed ledges, and fitted within a corresponding shaped shell also provided with teeth, the whole being combined and arranged to effect the desired result. The inventor is W. C. Geer, of Rockville, Conn.

LADIES' DRESS SUPPORTER.

This invention in skirt supporters consists in a certain novel form and arrangement of short bows with a semi-circular bow of cane, whalebone, metal, or other material, in which stiffness, flexibility and elasticity are suitably combined, covered with a suitable material and furnished with a waistband and strings, the whole, when applied to the body of the person in a novel manner, constituting a supporter by which the skirts can be supported in such a manner as to relieve the waist and hips of unnecessary pressure. The inventor is John McNeven, of Brooklyn, N. Y.

CENTERING MACHINE.

This invention consists in a novel arrangement of the clasping device and drill, whereby articles of varying diameters and forms may be expeditiously and accurately centered for the lathe. The inventor is James Cumming, of Boston, Mass.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 25, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

25,873.—B. F. Avery, of Louisville, Ky., for an Improvement in Molding Plows:

I claim the peculiar construction of the patterns, B C, of the short land-side, as set forth, so that they may be drawn at opposite angles from each other, for the purpose and in the manner specified.

[This invention consists in constructing the pattern for the short landside of the plow patented by this inventor January 8, 1856, in two parts, so that they may be drawn at opposite angles from each other, and in this manner forming the holes or depressions and ridges, or depressed squares upon the outer surface of the short landside, and by this means giving a variety of forms, by which the joint or lock for fastening the landside to the moldboard of cast-iron plows may be used.]

25,874.—G. H. Babcock, of Westerty, R. I., for a Bronzing-machine:

I claim, first, In combination with mechanism for conveying the sheet, the use of rubbing cylinder, K, and brush, F, one or more of each, for the purposes and operating substantially in the manner described.

Second, I claim the use of one or more stationary rubbers, H, or their equivalents, for the purposes specified.

Third, I claim the wires, x x x x, or their equivalents, for freeing the brush from the powder.

Fourth, I claim constructing the gripper in the manner described, whereby I obtain the advantages set forth.

Fifth, I claim enclosing the rubbing and brushing cylinders in a case, for the purpose of retaining the powder and preventing waste.

25,875.—J. W. Barcroft, of Friendship, Va., for an Improvement in Ditching-machines:

I claim, first, The combination of a revolving wheel, B2, having its buckets, or scoops, C, set tangentially with a stationary circular guard, I, and an adjustable scraper, G, substantially as and for the purposes set forth.

Second, Having the buckets or scoops hung on an axis, D, at the center of their length, and adjustable at both ends, substantially as and for the purposes set forth.

Third, Providing sharp cutters, a, projecting at right angles from the center of the scoop, substantially as and for the purposes set forth.

[This invention consists in a revolving wheel, with a series of diggers on its circumference. The diggers conduct the dirt into the inside of the wheel where it is scraped off, and caused to fall on to a conveyor. The diggers are adjustable, so as to dig both in the back and forward movement of the machine, and thus avoid the necessity of turning the machine round. This appears to be a well-contrived machine, and we should think it would work to advantage in many locations.]

25,876,—Wm. T. Barnes, of Buffalo, N. Y., for an Improvement in Sewing-machines:

I claim the arrangement of the threaded elastic looper, H, as constructed with a receiving and transferring spring, G, when the two are secured on opposite sides of the needle and operated to and from the needle by means of levers, E and F, connecting-rods, D and D', and frames, C C, the several parts being combined and connected, substantially as and for the purpose set forth.

25,877.—Mellen Battel, of Albany, N. Y., for an Improvement in Coal-sifters:

I claim the stationary plows and brushes, and ribbons, in combination with the horizontal revolving sieve, as before described and set forth, and made to operate.

25,878.—C. F. E. Blaich, of Elyria, Ohio, for an Improved Apparatus for Operating Rudders:

I claim the combination of the rudder, B C, spiral ribs, D, and spirally grooved sliding tube, E, substantially in the manner and for the purposes set forth.

[This invention consists in arranging two spiral flanches or ribs on the rudder shaft, and fitting on said shaft and to the flanges a sliding tube, having spiral grooves in its eye or bore. This tube is attached to a lever, so that by depressing the lever it is raised, and its grooves, in concert with the spiral flanches, cause the shaft and rudder to turn. This is a very neat and good arrangement, and by its use considerable of the gear which is now required to operate the rudder can be dispensed with.]

25,879.—C. C. Bomberger, of West Carlisle, Pa., for an Improved Method of Elevating Water:

I claim the arrangement of the air-tight boxes, C F, connected by the pipe, G, and communicating respectively with the pipes, A D, in connection with the open vessel, E, tube, H, and the valves, b o, placed to the tube, H, and pipe, P, and operated automatically as shown or in an equivalent way, for the purpose set forth.

[This invention consists in a novel arrangement of air-tight boxes, pipes and valves, so arranged that water may be elevated, and a force or pressure given the same, whereby it may be propelled to certain points at a distance from the well, spring or stream, or used for the propulsion of machinery.]

25,880.—W. N. Brown, of New York City, for an Improvement in Mechanism for Converting Rotary into Reciprocating Motion:

I claim the rock shaft, D, having a hollow hub, F, substantially as described, in combination with the oblong ring, H, and rotating cam J, the said parts being made and operating in the manner set forth and for the purposes described.

25,881.—M. J. Butler, of Nashville, Tenn., for an Improved Floating Safety Cabin:

I claim the arrangement of the detached boat-shaped cabin, A, gate propeller, I J K M, jointed hinged straps, D D, wedge, E, rudder, F, windlass, G, ordinary vessel, O, valve, S R Q, and passage, P, and stairs, N, all in the manner and for the purpose set forth.

[This invention consists in making the cabin of large sea vessels and ships in the form of a boat, and with all the necessary appurtenances for propelling and steering by hand. This cabin is confined on board by straps and chocks, so that in case of the occurrence of fire, leak or other dangerous disaster, it can readily be detached and allowed to float off, when certain valves in the hold of the vessel are opened, and the ship is sunk. By this arrangement the passengers and crew can be saved, as the cabin is to be made of sufficient capacity to accommodate a large number, and is furnished with a propeller, steering apparatus, &c. This is certainly an invention worthy of attention, since its design is to save that which is the most valuable of all things—human life.]

25,882.—M. M. Camp, of New Haven, Conn., for an Improved Surf Life-boat:

I claim, first, The combination of the water ballast chamber, D, with the aperture, E, and air-pipe, H, for the purpose of ballasting the boat, when she enters the water, and of lightening it when she touches and reaches the shore, as set forth.

Second, The combination of the valve, F, with the ballast chamber, D, and aperture, E, for the purpose specified.

Third, The combination of the floors, C and G, for the purpose of forming the air-chamber, E, beneath the working floor, and between the two floors, as described.

Fourth, The combination of the divisions, I I, with the working floor, G, to form receptacles between said divisions and the sides of the boat, as and for the purpose set forth.

25,883.—J. R. Cannon, of New Albany, Ind., for an Improvement in the Construction of Glass Coffins:

I claim constructing a coffin of glass, the body of which is provided with a groove, x x, and the lid with a flange, a a, and a pump, B, the lid being secured to the body by means of metallic bands, D D, substantially as and for the purpose specified.

25,844.—M. H. Collins, of Chelsea, Mass., for an Improvement in Machines for Bolting Flour, &c.:

I claim, first, A curved frame, in which are placed one or more bolting sieves, d q, this frame being open at eachend for the discharge of bran or other coarse material, substantially as and for the purposes set forth.

Second, The combination with the curved frame and sieves of a corrugated rubber, t, the frame and sieves having a vibrating motion in the path of a circle, while the rubber remains stationary, substantially as and for the purposes set forth.

Third, The arrangement of sieves of different sized meshes, and having the same vibrating motion on the circular vibrating frame, and in the relation shown to a fan wheel, which causes a draft at the back of the machine, substantially as and for the purposes set forth.

[This invention consists in a circularly vibrating bolting-frame, open at both ends, and with a sieve in its bottom, so that it bolts on both ends, and discharges the flour through its bottom, and the foreign substances at opposite ends. With this frame is used a peculiar united casing, with a series of receptacles for the various grades of flour, bran, chaff, &c. The secondary separation of the substances being operated is effected by auxiliary screens arranged in the vibrating frame, and by means of a suction fan. The arrangement as a whole is very complete, and by the slightest possible changes it answers for bolting flour, scouring grain, separating quartz, &c.]

25,885.—C. O. Crosby, of New Haven, Conn., for an Improvement in Sewing-machines:

I claim, first, The rotary bobbin case, H, armed with the inclined loop spreader, H', and supporting on a pin, w, in its center, the bobbin, G, which holds one of the threads, in combination with the loop detainer, x, when the whole is constructed, arranged and made to operate substantially as and by the means described.

Second, I claim the method of detaining the loop of the needle-thread after the loop has passed the full diameter of the bobbin-case, by the projection and inclined plane terminating in a point on the buffer.

Third, I claim the frame or form, composed of the curved bar, O, bar, R, and foot, k, in combination with the bolt, D', elbow-shaped lever, i (carrying the pieces, g), and friction cap, a', when the whole is constructed, arranged, connected and made to feed the materal, substantially as described.

25,886.—James Cumming, of Boston, Mass., for an Improvement in Centering-machines:

I claim, first, The arrangement of the notched interlocking slides, H H', right and left screws, G G, pinions, E E d d, shaft, D, bed-plate, C I, and upright drill, J, all for operating together in the manner and for the purpose described.

Second, The combination of the drill-arbor, J, hollow swivel oiling-cap, K L, independently rising and falling rod, j, and disk, k, attached in the manner and for the purpose described.

35,887.—R. C. Cyphers, of Milledgeville, Ga., for an Improved Washing-machine:

I claim, first, The arrangement of the elastic suspended concave, B, with slats, f, pivoted to elastic strips, g, in combination with the jointed spring-rubber, C, substantially as and for the purpose described.

Second, In combination with the jointed spring-rubber, C, I claim the employment of a flexible band or rope, m, for the purpose of securing the clothes to the rubber, substantially as specified.

Third, The arrangement of the central shaft, f', in combination with the elastic suspended concave, B, and grooves, n, substantially as and for the purpose set forth.

[This invention relates to that class of washing-machines in which a vibrating rubber operates in a concave suspended from springs. The effect of this machine is increased by arranging the rubber with spring joints, and by connecting the slats of the concave with elastic bands, so that the rubber adapts itself the more readily to the concave, and that each slat of the latter has an independent working motion. The clothing is secured to the rubber by an elastic band, and the rubber is guided by its central slat projecting into grooves in the sides of the tub.]

25,888.—Horace L. Emery, of Albany, N. Y., for an Improvement in Harvesters:

I claim, first, Combining with the cutter-bar an adjustable arm or lever, provided with a roller or other means of sliding easily upon the ground, for the purpose of sustaining the cutter-bar at any re-

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quired distance from the ground, or allowing it to rest upon the ground at pleasure, for the purposes set forth.

Second, I also claim placing said arm directly in rear of the shoe, in order that it may be prevented by said shoe from clogging, as described.

Third, I also claim connecting said arm by a rod along the back of the cutter-bar with a lever near the frame of the machine, so that the attendant may elevate and depress the cutter-bar at pleasure.

25,889.—George M. Evans, of Pittsburgh, Pa., for an Improvement in Seed-planters:

I claim the combination and arrangement of the seed-drums, x, elevators, e, on the belt, f, with the compartments, 1 2 and 3, of the hopper, d, the cranks, i and j, the connecting-rods, k, the ratchet-wheels, B and B1, and the wheel, b1, as described and for the purpose set forth.

25,890.—H. B. Fay, of New York City, for an Improvement in Coffee-pots:

I claim the arrangement of the tube, d, in combination with the adjustable double-strainer, D, that is arranged in a pot, A, betweeen the spout and the liquid, substantially as and for the purpose specified.

[In this pot the liquid is kept in contact with the grindings until all the flavor is extracted, the liquid coffee being allowed to mingle with the grindings without allowing it to carry off some of the same. This object is obtained by placing, between the spout and the liquid, an adjustable double-strainer, which contains the grindings, and through which the liquid, as it boils, passes up and down a number of times, until the flavor from the grindings is completely extracted. The air from below this strainer is allowed to escape by a central tube, which also serves for the handle to raise and lower said strainer, and to adjust it to the quantity of liquid in the pot.]

25,891.—Felix A. Finn, of New York City, for an Improvement in Studs and Sleeve-fasteners:

I claim, first, The swivel-bar and arm, arranged and operating as specified and for the purpose set forth.

I also claim, in combination therewith, the dovetail stud, m, to confine the front end of the arm, f, when closed upon it, as and for the purposes set forth.

I also claim the projecting screw, C, against which the spring acts, as described.

I also claim, in combination with the above devices, the spring constructed and arranged as set forth.

25,892.—Frederick O. Degener, of New York City, for an Improved Automatic Fan:

I claim the arrangement and combination of a rotary fan-blower, with the hollow vibrating or distributing fan, for the purpose of producing a current of air and causing it to be distributed, substantially as and for the purpose specified.

25,893.—B. Wells Dunklee, of Boston, Mass., for Improved Valves for Stoves, Furnaces, &c.:

I claim the side plates, a c, projecting from and connected with the hoe valve, b, as related to each other, and in respect to the openings, h h, and flue, F, substantially in manner and for the purpose as described.

25,894.—Wm. Fridley and Frederick Cornman, of Carlisle, Pa., for an Improvement in Preserve Cans:

We claim the employment of a perforated cover, B, in combination with the gasket, C, and mouth, b b, as shown and described, so that the gasket constitutes virtually a portion of the cover of and an index to the condition of the contents of the vessel.

[This invention consists in the combination of a certain construction of the cover of a can or other vessel for preserving fruit and other substances, and a certain mode of applying a gasket of india-rubber, gutta-percha, or other flexible and impervious material, between the said cover and the mouth of the vessel, as described, whereby provision is made for closing the vessel perfectly tight, and also for showing the condition of the contents.]

25,895.—W. C. Geer, of Rockville, Conn., for an Improvement in Machine for Cleaning and Opening Flock:

I claim the employment or use of a revolving cone or cylinder, C, provided with toothed lugs, a, and placed within a correspondingly shaped toothed shell, B, in combination with the toothed cylinder, I, concave, J, and fan, G, arranged for joint operation, substantially as and for the purpose set forth.

25,896.—Daniel Gordon, of Evansville, Ind., for an Improved Implement for Boring Earth:

I claim arranging the blades, c, on the convex surface of the bottom of the auger, and extending the cut beyond the periphery, as represented.

I also claim arranging the valves in the concave sides of the bottom of the auger, as set forth.

25,897.—Daniel Hess, of West Union, Iowa, for an Improvement in Machinery for Cleaning Cotton:

I claim, first, The curved metallic division, F, in combination with the front rollers, B B, and the bolting cloth, substantially in the manner and for the purpose set forth.

Second, The combination of the fan, C, and case, E, with the back rollers, B B, and the bolting cloth, D, for the purpose of cleansing the cloth from fibres of cotton, substantially as specified.

25,898.—Silas Hewitt, of Seneca Falls, N. Y., for an Improvement in Pumps:

I claim the plunger or bucket, when constructed in the manner and for the purposes set forth.

25,899.—Isaac Hoskins, of Wilmington, Ohio, for an Improvement in Ditching and Grading Machines:

I claim making the side wheel adjustable so as to raise and lower the side of the frame, to level or adjust it as desired.

I also claim a bell made of bars with projections or flanges at each end, arranged to travel under cleats on the sides of the frame or trough, substantially as described.

25,900.—Anthony Iske and Jacob Teufel, of Lancaster, Pa., for an Improved Door Latch and Lock:

We claim the arrangement and combination of the curved swivel lever, D, bolt, H, with its peg, f, and projecting end to answer both for turning, pulling and pushing together, as shown, with the revolving lever, s, for operating the lock, when these several parts are made for the purpose and in the manner described or specified.

25,901.—Edwd. H. Jones, of Albany, N. Y., and Robt. Stevenson, of Schenectady, N. Y., for an Improvement in Furnaces for Steam-boilers:

We claim the arrangement of the hopper-shaped grate box, B D, so constructed as to be adjustable in hight, combined with the grates, E E, having means attached for rocking or agitating them, in their relation to each other and to the boiler fire-box, A, in the manner and for the purposes set forth.

25,902.—S. F. Jones, of St. Paul, Ind., for an Improved Mole Plow:

I claim, first, The employment of the ball, a, not generally, but when said ball is secured in such a manner upon the top of the rear of the mole that it will revolve when the mole is in motion, for the purpose of arching the top of the drain and closing the opening of the coulter, substantially as set forth.

Second, The combination of the nose, E, mole, D, ball, a, rod, d, and wheel, F, when the same are used for the purpose of forming and arching the drain and closing the opening of the coulter, substantially as and for the purpose set forth.

25,903.—Louis Koch, of New York City, for an Improvement in Moving Tread Power:

I claim, first, The described mechanism, or its equivalent, when operated by the feet of man or animal, in stepping on the ends of bands or cords during the act of walking.

Secondly, I claim using the weight of man or animal in stepping on bands, or their equivalent, as a cause of resistance against the propelling of the machine, and giving motion by the walking of said man or animal to said mechanism, or its equivalent, independently of the motion of the wheels on which the whole mechanism is supported, substantially as described.

25,904.—Charles N. Lovejoy, of Columbia, S. C., for an Improvement in Cotton Presses:

I claim the guides, Y, for guiding the chains, W and X, upon fusee wheels, S, and the follower, I, block, J, and windlasses, T and Z, arranged and operated with each other and in the manner as described, when combined with the cotton box, E F and G, and its operative parts, L and S, in the manner described and for the purposes fully set forth.

25,905.—John McNeven, of Brooklyn, N. Y., for an Improvement in Skirt-supporters:

I claim the described dress-supporter, consisting of a hoop, A, and stiffeners, C, branching off from said hoop, A, the wristband, G, and tapes, J J, when the same are arranged and combined and applied to the body, substantially in the manner and for the purposes described.

25,906.—L. H. Miller, of Baltimore, Md., for an Improvement in Doors for Iron Safes:

I claim the combination of the tongue, f, grooved flanges, b b1 b2 b3, V-shaped moldings, c c, and V-shaped grooves, e e, in the construction of a fire-proof safe or bank vault, substantially in the manner and for the purpose described.

25,907.—Thos. Moore, of Minneapolis, Minn., for an proved Apparatus for Generating Steam:

I claim the employment, in combination with a steam-engine or other apparatus in which steam is used and the boiler which supplies it, of a system or arrangement of one or more condensers and heaters, with connecting pipes and a tank, whereby the exhaust steam, after passing along a pipe running through the boiler itself, is condensed by delivering up its remaining latent heat to water which, after having been previously condensed in the same manner, is on its way back to the boiler, and whereby the water obtained by the condensation of the exhaust steam is heated on its way back to the boiler and partly converted into steam again by the combined agencies of the latent heat it absorbs from the escaping steam, and by the heat it absorbs from the escaping waste production of combustion, substantially as described.

[This invention consists in the employment, in connection with a steam-boiler and steam-engine, or other apparatus in which steam is used, of a certain system of pipes and vessels, whose object is the condensation of the whole of the exhaust steam of the engine, or other apparatus, for the purpose of returning the water of condensation to the boiler, and saving the whole of the latent heat in said steam.]

25,908.—James W. Neff, of Sacramento, Cal., for an Improvement in Windmills:

I claim the arrangement of the sails, D, arms or spokes, G, and hub, E, as described, and placing them in rear of the spiral spring, A, and flange, B; and connecting the flange, B, with sails, D, by rods, F, the whole operating as described and for the purposes set forth.

25,909.—George Neilson, of Boston, Mass., for an Improvement in Coffee-pots:

I claim the reversible cafetiere as composed of the boiler, A, the filtering biggin, B, the foraminous cup or strainer, C, and the condenser or coffee-pot, D, having a spout, h, and cap, i, the whole being arranged in manner and so as to operate as explained.

I also claim the combination of the air and tell-tale pipe, c, with the boiling vessel, A, the condensing vessel, D, the biggin, B, and the [illegible] being as explained.

25,910.—Adrian V. B. Orr, of Lancaster, Pa., for an Improvement in Nail Machines:

I claim, first, Combining, in a single pair of dies, constructed as described, the operations of cutting, pressing and gripping the nails or spike, substantially as specified.

Second, I claim the slide point, 6, operating as described, in combination with the slide, h, arranged as specified and for the purpose set forth.

25,911.—Geo. F. Outten, of Norfolk, Va., for an Improvement in Car Brakes:

I claim the combination and arrangement of slide, H, pawl, g, spring, a, ratchet wheels, B, and chain, I, levers, d and b, and spring, h, operating automatically or by hand as may be desired, as set forth and described.

25,912.—Elhanaan Puffer, of Oxford, N. Y., for an Improved Apparatus for Raising Water from Wells, &c.:

I claim producing and controlling the movements of the windlass, roller, A, upon and with its actuating shaft, B, in such a manner as to prevent the necessity of ever imparting a reverse rotary movement to the windlass shaft whilst operating said apparatus, and by means substantially the same as those represented and described.

I also claim combining the valve, j, which closes the discharging aperture in the bottom of the bucket, C, with the inner end of the lever, h, which is pivoted to the after edge of the mouth of said bucket, when a rod, l, or the equivalent of the same, is so situated within the curb as to be taken hold of by the hooked-shaped outer end of said lever just before the backet reaches its highest position, for the purpose of causing the further upward movement of said bucket to throw forward its bottom and discharge its contents, substantially as set forth.

25,913.—T. J. W. Robertson, of New York City, for an Improvement in Sewing-machines:

I claim the arrangement and combination of the carrier, M, spring plug, Q, and vibrating arm, L, substantially as and for the purposes shown and described.

25,914.—Alfred Rose, of Penn Yan, N. Y., for an Improved Churn-dasher:

I claim the churn-dasher, when made in the manner substantially as specified and set forth.

25,915.—Albert W. Roberts, of Hartford, Conn., for an Improved Disengaging Hook:

I claim, as a new article of manufacture, a hook consisting of a hook link, E, with bearer, G, on its side, in combination with the jointed ring, A, lever, D, crank pin, c', and collar, e, substantially as described.

25,916.—F. M. Robinson, of Conneautville, Pa., for an Improvement in Mills for Crushing Sugar-cane:

I claim the combination of the flanged journal boxes, D, with the flanged sockets, e, in connection with the flanges, g h, of the above parts, all as and for the purpose shown and described.

[This mill is so arranged that it can be used horizontal or upright. The journal boxes are provided with annular ledges placed in an inclined position, so that the same form a channel to conduct the juice that may drop down over the side plates around the journal boxes and down to the lower part of the mill. The journal boxes of the main roller are adjustable, so that the same can be brought nearer to or further from the secondary rollers without interfering with the above mentioned annular ledges, and those journal boxes, which are below when the mill is used in a vertical position, are caped over so as to retain the lubricating substance.]

25,917.—Samuel Samuels, of Brooklyn, N. Y., for an Improvement in Reefing Fore-and-aft Sails:

I claim supporting the rolling-boom in two bearings, one of which is in a truss connected with the mast by a hoop, or its equivalent, and the other in a ring, which is held by the lift and braces, substantially as specified.

And I further claim the combination, with the rolling-boom, of the gypsy-purchase, applied as described.

25,918.—Irwin B. Sawyer and T. Alsop, of Springfield, Ill., for an Improvement in Sewing-machines:

We claim the use of the hook, q, formed and moving substantially as described, combined with the shuttle and needle, substantially as described and for the purpose specified.

25,919.—Thomas S. Seabury, of Stony Brook, N. Y. (assignor to R. B. Gorsuch, of New York City), for a Pianoforte Action:

I claim, first, Pivoting the hammer-butt to a post, or its equivalent, carried by its respective key, substantially as specified, for the purpose of enabling it to be withdrawn from the instrument along with the key.

Second, The suspended jack or fly-lever, E, attached to the hammer-butt, and provided with a notch, e, operating in combination with stationary rail, F, substantially as described.

Third, The arrangement of the regulating-screw in the suspended jack or fly-lever, in combination with the inclined plane, f, on the post erected upon the key, to carry the hammer, substantially as described; but I wish to be understood as not claiming, generally, either the placing of the regulating-screw in the jack, or the employment of an inclined plane or wedge, to act in combination with an inclined or wedge-like surface.

Fourth, The check, H, applied to the bottom of the key, and operated in combination with the suspended jack or fly-lever, substantially as described.

25,920.—Isaac M. Singer, of New York City, for an Improvement in Carriages:

I claim the arrangement, in the main body of the carriage, of the low seats, in combination with the elevated seats, arranged in manner substantially as described and for the purposes set forth.

I also claim, in combination with the back, depressed and elevated seats, as described, the arrangement of the hinged partition to answer the three-fold purpose of a step to get to the elevated back seats, and back to the middle depressed seat, and to separate the feet of persons sitting on the elevated seats from the persons sitting on the depressed seats.

I also claim, in combination with the front elevated seats, as described, the arrangement of hinged step leading to the elevated seats, together with its dirt-flap, as described, for the three-fold purpose of a step to the elevated seats, a dirt protector, and of a seat in case of necessity.

I also claim the arrangement of the boot for baggage in the space between the bottom and the front elevated seats, with doors at the sides, as described, thus placing the weight below, and concentrating it on the front axle as described.

I also claim the combination with the main body of the carriage, the placing the coupe at the rear thereof, and communicating therewith by a door-way through the back as described.

I also claim depressing the coupe at the back of the main body, that the bottom of both may extend below and leave the required open space for the rear axle and its connections; and that the top of the coupe may form a foot-board to the seats, at the back edge of the main body, as described.

I also claim, in combination with the coupe, the open spaces under the back elevated seats of the main body opening into the coupe, as described and for the purposes set forth.

25,921.—George A. Stone, of Roxbury, Mass., for an Improvement in Thrust-bearings for Rotary Shafts:

I claim, first, The combination of these four things, namely, a collar or collars on the shaft; washers, provided with grooves on their faces, extending from their outer to their inner edges, made substantially as described; a reservoir of oil or other lubricating material; and a pillow block or stationary resistance; all being and acting in combination, as described, and for the purposes set forth.

[illegible] their faces, a reservoir of lubricating material, a pillow block or its equivalent, and a collar on a shaft, all as specified in my first claim, I claim grooves extending from face to face of the washers, made substantially in the manner and serving the purposes described.

25,922.—F. Swift, of Hudson, Mich., for an Improvement in Grain-separators:

I claim the employment or use of a supplemental shoe, C, placed within the shoe, B, provided with screws, c, and having an independent longitudinal shake movement given it, while the shoe, B, with its screws, p, has the usual lateral shake movement imparted to it, substantially as and for the purpose set forth.

[This invention relates, first, to an improvement in the screening operation, whereby the screens are rendered much more efficient than hitherto, without adding materially to the cost of construction or rendering the device more complex than usual; second, in an improved means employed for regulating the strength of the blast from the fan, whereby the desired result is obtained by a very simple adjustment.]

25,923.—Peter Van Antwerp, of New York City, for an Improvement in Keys for Locks:

I claim constructing the stems of keys with a hole near the end, instead of the usual permanent bow or ring-handle, and to be fitted loosely to the usual ring for connecting a series of keys, and in such manner, substantially as described, that said connecting-ring shall answer the further purpose of the usual bow or fixed ring for turning the keys when inserted in the lock as set forth.

25,924.—John L. Whipple, of Detroit, Mich., for an Improved Spring Bed:

I claim the general arrangement of the seat, S, spring, W, and the strap, L, when constructed in the form described, and combined for the purpose in the position as set forth.

25,925.—John L. Wentworth, of Spread Eagle, Pa., for an Improvement in Field Fences:

I claim constructing each section of a fence of the two end posts, A and B, upper and lower longitudinal rails, C and D, any suitable number of intermediate rails, E and F, and the vertical bar, G, when the several parts are arranged in respect to and adapted to each other substantially as set forth.

25,926.—Franklin Wesson and Nathan S. Harrington, of Worcester, Mass., for an Improvement in Breech-loading Fire-arms:

We claim, first, The arrangement of the mechanism for locking and unlocking the barrel, and the arrangement of the trigger, substantially as described.

Second, We also claim the combination, with the locking and unlocking mechanism, of the spring, K, arranged substantially as described for elevating the breech.

Third, And we claim, in combination with the barrel, the wedge-shaped recess in the recoil-plate, arranged substantially as described for the purpose set forth.

25,927,—J. S. Voorhies, of Catlettsburg, Ky., for Improved Portable Shelves:

I claim constructing portable box-shelving for stoves, book-cases, and all similar purposes, in the manner described and operating as set forth.

25,928.—Dutee Wilcox, of Providence, R. I., for an Improvement in Shirt Studs:

I claim the described new or improved mode of making a shirt stud or button, viz.: of the two parts or plates, A B, and the two hooks or curved holders, C D, constructed and applied or arranged together, substantially in manner and to operate as described.

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25,929.—Joseph Adams, of Cleveland, Ohio (assignor to himself and B. Barker, of same place), for an Improvement in Cannon:

I claim the use and application of a piston for the purpose of loading, cleaning and cooling a cannon, the stem or end, G, of which passes through the breech or rear end of the gun, and is attached to a head or metallic piston, the circumference of which is equal to that of the bore of the cannon, and is made to fit the same exactly, and which piston-head, when drawn back, rests upon the main shoulder or substance of the breech at the point where the rod, G, connects therewith, and is of sufficient length to cover and serve as a valve to close the lateral opening at the breech end of the cannon, through which water is admitted to fill the bore of the gun when said piston is forced forward towards the muzzle, and which piston plays forward and backward, the entire length of the bore of the gun, so as to protrude sufficiently at the muzzle when forced forward, thus carrying out any substance of the exhausted cartridge after firing, and to which piston-head or bulb the new cartridge is attached and drawn back to the breach or butt of the gun by the force applied to said rod, and in which condition the gun is loaded and ready to be again discharged.

Second, I claim the construction and employment of a lateral opening from the main chamber or bore of the gun, either passing through the breech-pin or otherwise, at or near the rear end thereof, and where the same will be closed and covered by the piston-head, when the same is fully drawn back into (or by means of a tube or pipe connecting with a water-sack or vessel), and by means of which arrangement water is admitted and drawn into the gun by the same force which carries the piston forward to receive the charge at the muzzle and is returned to the vessel again by the same force which carries in the charge, thus washing and cooling the gun at every discharge, without any other movement than that necessarily employed in the act of loading alone.

25,930.—M. C. Cronk, of Auburn, N. Y. (assignor to himself, Wm. Boynton, Jr., and Albert H. Goss, of same place), for an Improved Mode of Feeding-in Fuel to the Fire-boxes of Cooking-stoves:

I claim, first, In combination with the stationary upper fire-box, a rocking or swinging fire-box underneath , having a flange or cut-off, o, connected thereto, substantially as described.

I also claim, in combination with the rocking or swinging fire-box and cut-off, a rising and falling grate, H, substantially as described.

I also claim, in combination with the rocking or swinging fire-box, and rising and falling grate, a single rod or shaft, with its cams for operating both, substantially as described.

25,931.—L. W. C. Farrington, of Lowell, Mass. (assignor to Tuttle & Mudge, of Boston, Mass.), for an Improvement in Stoves:

I claim a parlor stove, having an oven, which is opened by raising the top in the manner substantially as set forth.

25,932.—Charles Younglove Haynes, of Philadelphia, Pa. (assignor to C. Y. Haynes & Co., of same place), for an Improvement in Razor Strops:

I claim the strop, when constructed substantially in the manner and for the purposes described.

25,933.—W. H. Howland, (assignor to himself and John O. Hanson) of San Francisco, Cal., for an Improved Amalgamator:

I claim the combination of a pair of grinding cones, F, G, revolving in different directions, with a horizontally-oscillating chambered dish, G, substantially as and for the purposes shown and described.

25,934.—Joseph Ives, of Bristol, Conn., for an Improvement in Watches:

I claim first, The combination of the spring, B, lever, C, and cam, D, substantially in the manner as and for the purpose described.

Second, I claim the substitution of ribbed, corrugated, planished or unplanished tin plate for running gear, &c., (for other metal) when used in combination with the rolling pinion, substantially as and for the purpose described.

Third, I claim making a crown-wheel with rollers instead of teeth, to prevent slide and friction upon the rings of gallet, in the manner and for the purpose described.

25,935.—George W. Slagle, (assignor to himself and O. A. Dailey) of Washington, D. C., for an Improved Composition for mixing with Paints:

I claim making melaniline oil, or a substitute for linseed oil, by mixing together linseed oil or other vegetable oil possessing similar qualities, water and sal soda, or other similar, suitable alkali, substantially in the manner set forth.

RE-ISSUES.

S. W. Hoffman and Adam J. Frederick (assignees through mesne assignment of Robert McWilliams) of Philadelphia, Pa., for an Improvement in Journal Boxes for Railroad-cars. Patented July 19, 1859:

We claim, first, The upper half, A, of the box with its socket formed by the flange, h, in combination with the lower half, B, of the box, when the two halves are arranged substantially as set forth, so that on adjusting the lower half to its place, it may assume the position shown in Fig. 1, and so that when adjusted, the end, w, of the oil-chamber shall be close to the axle, as and for the purpose specified.

Second, The self-adjusting leather-packing, E, and the metal plate, F, when both are dependent upon the lower half of the box for their proper position within the other half, and when they are otherwise arranged in respect to the upper and lower halves as and for the purpose set forth.

W. S. Stetson, of Baltimore, Md., for an Improvement in Harvesters. Patented April 5, 1859:

I claim, in combination with a main frame, H, supported upon two carriage wheels, A A', which frame bears the shaft, M, and main cog-wheel, S, a second frame hinged to and vibrating about said shaft, M, so that the crank-shaft on said second frame shall always be in a radial line to the main cog-wheel, S, however much said second frame may vibrate on the main frame, as set forth.

Second, I claim supporting the crank-shaft, V, upon a vibrating-frame, R, intermediate between the cutter-bar or its shoe, X, and the main frame, H, when said main frame bears the main cog-wheel, S, and said intermediate frame vibrates or turns about an axis parallel to the axis of the driving or carriage wheels as set forth.

W. S. Stetson, of Baltimore, Md., for an Improvement in Harvesters. Patented April 5, 1859:

I claim, first, The main frame, H, which bears the pinion, K, and has its vibratory motions up and down independent of the motions of the platform and pole, in combination with the vibrating-rod, R, intermediate between the said main frame and cutter-bar, as set forth.

Second, I claim combining the adjusting-lever, Z, with the platform, C, and main frame, H, in the manner and for the purposes set forth.

Third, I claim giving to the main frame, H, which bears the driving-pinion, K, a back and forth motion upon the axle tree, as set forth.

W. S. Stetson, of Baltimore, Md., for an Improvement in Harvesters. Patented April 5, 1859:

I claim the combination of the shoe, X, with the vibrating-frame, R, by means of axis, y, at the rear end of said frame, as set forth.

Second, I claim horsing or supporting the knife-bar in a position at right angles, or nearly so, to the carriage axle by two movements, substantially as set forth.

ADDITIONAL IMPROVEMENT.

Joseph F. Hall, of Bangor, Maine, for Improved Curtain Fixtures. Patented March 9, 1858:

I claim the application of the lever as explained and as it is represented in Fig. 2, in combination with the cord and tassel, with the pulley or eye in the end of the tassel, and for the purpose described.

EXTENSION.

David B. Rogers, of Pittsburgh, Pa., for an Improvement in Cultivator Teeth. Patented Nov. 1, 1845. Re-issued Sept. 20, 1859:

I claim making the shank or upper part of cultivator teeth of thin plate steel, U-shaped or curved round in front, substantially as described, for the purpose of securing the necessary strength to permit the tooth to be made entire, shank and blade, of a single piece of metal, and also enabling the tooth to be secured in its place in the hand by means of a wedge driven into the cavity of the shank, substantially as described.

DESIGNS.

Wm. Newton Brown, of New York City, for a Design for ornamenting Sewing-machines.

Andrew John Gallagher, of Philadelphia, Pa., for a Design for Cooking-stoves.

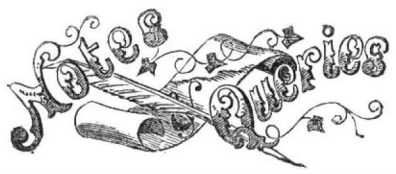
C. Harris and Paul W. Zoinier, of Cincinnati, Ohio, for a Design for Parlor Stoves.

Jeremiah Meger, of New York City (assignor to A. Sampson, of Manchester, N. H.) for a Design for Floor Cloths.

Thomas H. Wood, John E. Roberts and Henry S. Hubbell, of Utica, N. Y., for a Design for Cooking-stoves.

L. Q. C. Wishart, of Philadelphia, Pa., for a Design for ornamenting Bottles.

NOTE.—The foregoing list shows that SIXTY-THREE inventions have been patented this week; TWENTY-TWO of these patents, or more than ONE-THIRD, were either cases on which the specifications and drawings were prepared at this office, or rejected cases which have been prepared by the inventor or incompetent attorneys, and placed in our hands for attention.



W. A. H., of Miss.—Gold and silver are not attracted by the magnet, but are repelled by it. The metals which the magnet attracts are iron, nickel, cobalt, manganese, chromium, cerium, titanium, palladium, platinum and osmium. The metals which are repelled by the magnet are bismuth, antimony, zinc, tin, cadmium, sodium, mercury, lead, silver, copper, gold, arsenic, uranium, iridium and tungsten; bismuth being repelled with most force and the others with less force in the order in which we have written them. Your scheme for finding buried treasure by means of some delicate needle to be attracted by it is wholly impracticable. The idea that witch hazel will indicate the presence of water, and all kindred notions, are merely the delusions of ignorance.

J. S. H., of Vt.—We are told by good physicians that as good a work on the ear as any is "Sight and Hearing," by J. Henry Clark. You can get it by sending to S. S. & W. Wood, No. 389 Broadway, New York.

S. B. B., of Texas.—Unquestionably you are practically safe from prosecution for merely stamping a name or mark on a United States coin, if you do not reduce its weight or materially disfigure it.

J. H. S., of S. C.—Water grates composed of tubes is a very old contrivance, though it has been seldom used. The difficulty you have anticipated has shown itself in the experiments which have been made with it; and besides, the tubes get loose, owing to their expansion being greater than that of the fire-box.

W. A. H., of Iowa.—The power necessary to raise 1,000 lbs. with a 3-foot lever attached to a screw of 1-inch diameter and ⅛-inch pitch is 2·21 lbs. if the friction is disregarded, and the same power is required with a screw of 3 inches diameter and of the same pitch if the friction in both cases is the same. The friction with screws is very large, and it depends entirely on the workmanship and on the power applied to the same in proportion to their strength.

A. B. T., of N. Y.—If you invent and put into use a device which some other person subsequently invents and patents, you are still at liberty to continue the use. A patent granted under the circumstances named is invalid and worthless. Our laws require that the applicant shall be the original and first inventor; if he is not so, the grant is of no value.

S. P., Jr, of N. H.—A cheap protection of the sheet iron covering of your buildings from rust is a coating of coal tar from the gas-works. It will cost you about $2 per bbl.

J. McC., of Ohio.—Steam carriages on common roads have been tried repeatedly in this country and Europe, but we do not know of any one now running. Nearly 30 years ago, one was run over 30 miles an hour on one of the English turnpikes. The immense weight of a locomotive, jarring over a common road, causes such rapid wear that the expense of repairs has hitherto proved an insurmountable obstacle to their practical use. Lexington, Ky., is famous for its macadamized roads, and would perhaps be a good place for you to try your invention.

Wm. Allen Ingalls, of Chicago, Ill.—Wishes to correspond with a manufacturer of steel springs, with a view to purchase. Manufacturers will address him as above, box 4,206 Post-office. Similar inquiries to the above are made to us by every mail, and hereafter we propose to charge $1 for inserting such inquiries in the correspondence column, the amount to be forwarded at the time the information is sought.

O. E S., of Mass.—The spindle attached to the head-stock of a lathe is that which is called the line-center, and sometimes the line-spindle.

S. H., of N. H.—Wooden bobbins for factories can be made much cheaper from wood than india-rubber, and they are more durable, because the grease and oil used in a factory would soften the rubber.

R. M., of S. C.—We have received your specimen of copper ore. It appears to be very good, but without a quantitative analysis we could not inform you the amount of metal contained in it.

H. C. S., of Ill.—We are not acquainted with any process for softening fresh water shells. The application of heat will injure them, because they are principally composed of lime and a little gluten.

M. G. B., of Wis.—Air can be compressed so as to give out sufficient heat to ignite phosphorous and tinder. By compressing it to about three atmospheres—45 lbs. on the square inch—we have ignited a dry cloth prepared with niter.

W. B., of N. Y.—A non-conductor, such as a plate of glass, placed between a steel magnet and a piece of iron will not cut off the magnetic influence. A balloon, with a basket suspended from it and operated by a fan propeller, was exhibited in this city by Capt. Taggart, of Roxbury, Mass., about nine years ago. As your sketch represents a similar plan, of course it is not new. Captain Taggart endeavored to make an ascent from Jersey City, but his balloon was caught by some tall trees in the vicinity, and he came near being dashed to pieces by being thrown out of the basket. The excited crowd then cut the cords of the balloon, and after making a few surges, it bolted upwards and sailed aloft upon its solitary journey, and was never heard of afterwards.

A. C., of N. Y.—You can write indelibly on zinc with an ink made of nitrate of silver dissolved in ammonia, and thickened with a little gum arabic. We have been informed that Bath bricks are made of a peculiar kind of clay obtained at Bath, England, but we do not know the peculiar process by which they are rendered so porous.

J. R. N., of Ind.—The heat of the earth increases as we descend, at the rate of about one degree in every 50 feet. This increase is supposed to continue until the point is reached at which matter is melted, when it would necessarily cease; the freer circulation of the particles in a fluid state causing a nearly equal temperature throughout the molten mass.

S. S., of N. H.—Vinegar is composed of carbon, hydrogen and oxygen. Alcohol is composed of the same substances, in slightly different proportions. Almost all vegetable products, wine, cider, beer, starch, sugar, rosin, pitch, gum arabic, gum tragacanth, india-rubber, gutta-percha, prussic acid, &c., &c., are composed of three or all of the four organic elements—oxygen, hydrogen, nitrogen and carbon.

B. B. W., of Conn.—You propose to produce perpetual motion by the following arrangement: you balance with great delicacy a brass trough upon a pivot in the middle, and place within it a round iron ball. Under each end of the trough, you arrange a spiral spring and a spring-catch, the latter at such hight that it will hold the end of the trough below the level of the fulcrum. As the iron ball rolls down to the end of the trough, it releases the catch, and the spiral spring throws up the end above the level of the fulcrum. In order to raise it still higher, so that the opposite end will hook under its catch, you arrange two magnets, one directly over each end of the trough, so that they may attract the iron ball, and thus assist the tipping of the trough. It will not work. The force of a magnet is in inverse proportion to the square of its distance, measuring to a short distance within its end. Your magnet would attract the ball at one inch distance with a force nine times as great as the force with which it would attract it at a distance of three inches. If the force of a magnet only increased directly with the square of the distance, your plan would surely work. How many perpetual motions have been upset with an M? No doubt the Hon. Commissioner of Patents will grant you a patent for your invention, if you will exhibit to him a working model.

JOHN SMITH, JR., of D. C.—Your diagrams are at hand. We see no merit in one of your illustrations, and the other possesses no novelty, although much merit. Do not think you can get a patent on either. Have seen similar devices before.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Oct. 29, 1859:—

W. E. S., of N. Y., $30; D. A., of Mo., $40; A. P. T., of Ga., $35; J. E. C, of Mass., $55; N. J. E., of Wis., $30; W. S., of Va., $30; I. A. H., of R. I., $25; J. W., of N. Y., $55; C. H., of La., $20; N. C. K., of Mass., $30; G. S., of N. Y., $30; R. & S., of Ohio, $25; W. C., of Iowa, $30; L. G., of N. Y., $30; C. H. D., of Wis., $30; G. B. H., of N. Y., $250; T. S. B., of N. Y., $25; W. A., of Pa., $50; H. F., of La., $30; C. H., of N. Y., $30; O. S., of N. Y., $30, W. J., of R. I., $25; C. W., of N. Y., $30; W. B. S., of Pa., $25; J. W. H., of Ind., $25; I. H. M., of La., $175; S. B., of N. J., $25; J. W. C., of N. Y., $100; D. N., of Ill., $30; S. W. C., of Mich., $30; A. M. D., of Tenn., $30; I. G., of N. Y., $250; A. L., of N. Y., $27; L. I., of Mich., $25; R. M., of Pa., $30; G. W. B., of Ala., $27; H. A. R., of N. Y., $35; A. L., of Ga., $10; F. S. U., of N. Y., $30; W. & R. F., of N. Y., $30; E. M. & J. E. M., of N. Y., $30; D. M. H., of Conn., $30; J. M. H., of Miss., $30; D. C., of Pa., $25; E. S., of La., $175; T. Van D., of N. J., $30; N. H., of N. Y., $10; L. B. D., of Ohio, $25; P. K., of Conn., $25; S. B., of L. I., $50.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 29, 1859:—

L. J., of Mich.; W. J., of R. I.; P. N. B., of N. Y.; T. C. R., of N. Y.; A. L., of N. Y.; S. B., of N. J.; D. C., of Pa.; S. B., of L. I.; W. T. J., of Ill.; C. G. B., of N. Y.; W. J. H., of Ga.; J. A. H., of R. I.; L. B. D., of Ohio; J. W. H., of Ind.; C. H. D., of Wis.; G. W. B., of Ala.; W. F., of N. Y.; H. C. F., of Ohio; R. & S., of N. Y.; W. A., of Pa., W. B. J., of Pa.; P. K., of Conn.

Literary Notices.

PARLOR THEATRICALS.—Dick & Fitzgerald, publishers, New York.—This work supplies a demand created by the rapidly increasing popularity of a fashionable amusement. Its little dramas are written in a sprightly, pleasant style, especially those by Mr. Arnold.

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IMPORTANT TO INVENTORS.

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Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to such business as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business we have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. We also furnish a Circular of information about Foreign Patents.

The annexed letters from the last two Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
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PATENT EXTENSIONS.—ALL PATENTS FOR Inventions, granted by the United States during the year 1845, will expire by their own limitations during the current year (1859) UNLESS EXTENDED ACCORDING TO LAW. The statute provides for the extension of Patents for an additional term of SEVEN YEARS, the grant being made to the inventor himself, or if deceased, to his heirs and administrators. The EXTENDED TERM inures solely to the benefit of the inventor or his heirs. Assignees or owners of rights under the first term of the Patent have no rights whatever in the extended term. The inventor or his heirs may, however, sell their interests in the Extension prior to the grant thereof, in which case the Extended Patent, when granted, becomes the exclusive property of such purchaser. Applications for Extensions must be made at the Patent Office at least 65 days prior to the extension of the Patent. The undersigned, having had great experience in Patent business, will promptly prepare the various documents and prosecute Extension cases on moderate terms. For further information address
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Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

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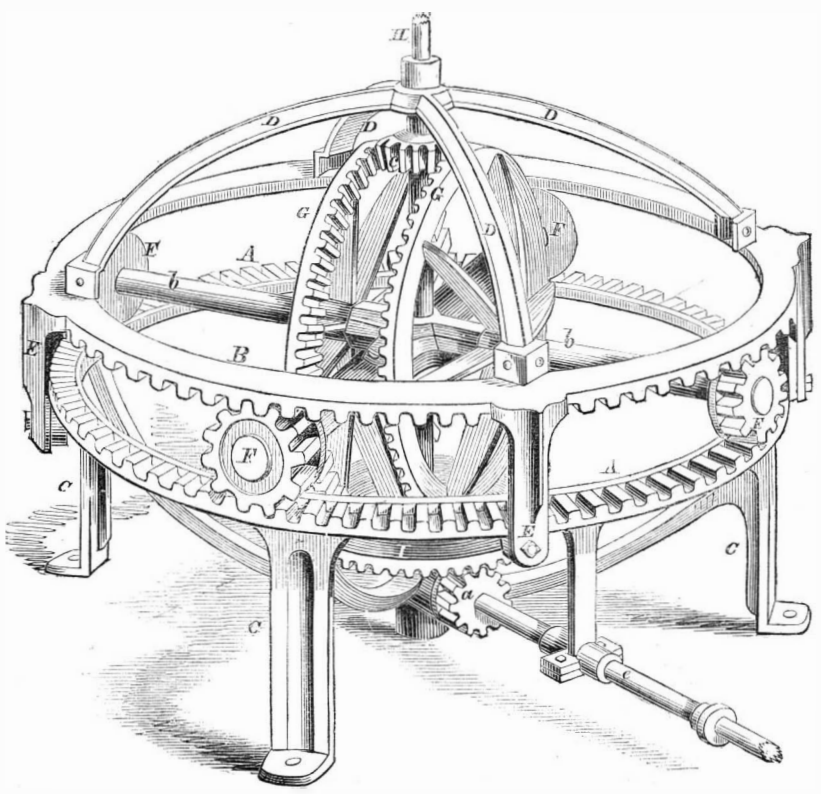
FAUGHT'S HORSE-POWER.

Whether the very best of all modes of connecting the power of animals to machinery has already been discovered, or whether it is yet to come from the teeming brains of our inventors, it is, of course, impossible to decide; but, judging from the rapidity with which inventions in this department succeed each other, it seems to be one of the most decidedly unfinished of mechanical problems. We illustrate one of the latest and most novel of these inventions.



FAUGHT'S IMPROVED HORSE-POWER.

The lower geared circle, A A, is supported at a proper hight by the upright standards, C C C, to which it is rigidly fastened. The upper circle, B, is cast in one piece with the curved bars, D D, with which it revolves. The hangers, E E, are firmly secured to the upper circle, B, and carry at their lower end the friction-rollers, *a*, which pass freely under the lower circle, and have shoulders which come against its edge. The upper circle, B, rests upon four pinions, F F F F, the axles, *b b*, of which carry the large beveled gear-wheels, G G, necessarily causing them to revolve, as will be seen, in opposite directions. A beveled pinion, *c*, is keyed upon the upright shaft, H, and gears into the wheels, G G. Fastened to the lower end of the shaft, H, is the horizontal beveled gear-wheel, I, which gears into the pinion, *d*, upon the shaft, *e*, which shaft leads away to the machinery to be operated. As the beveled wheels, G G, are carried around the shaft by the revolutions of the circle, B, a hole is made in the bar which snpports the journals of said wheels, through which hole the shaft, H, passes loosely. The horse is attached, by one of the hangers, E, or otherwise, to the upper circle, B, and travels around the machine. As the two wheels, G G, act in opposite directions upon both sides of the pinion, *c*, they produce no strain upon the journals of the shaft, H.

The patent for this horse-power was issued to L. R. Faught, of Atlanta, Ga., Sept. 20, 1859. The inventor will furnish further information in relation to it on being addressed as above.

IMPORTANT PATENT EXTENSION.

The patent granted to Lewis Edwards, of Norwich, Conn., Oct. 9, 1845, for an improvement in machines for ruling paper, has, through the Scientific American Patent Agency, lately been extended for a period of seven years. The invention is one of much ingenuity and importance to the trade to which it pertains. Prior to Mr. Edwards' discovery, the ruling pens were all lifted at the head lines, by the hand of an attendant; and it was necessary to stop, or nearly stop, the speed of the machine at the head or beginning of each sheet of paper. Mr. Edwards' invention consists, substantially, in causing *the paper itself* to lift the pens at the head lines, so that the sheets are fed through the machine, in one continous stream, without any stoppages. Steam or other driving power may be employed. In addition to the great economy of time thus gained, the work is said to be more uniformly done than it is by the hand method.

The evidence in this extension case developed some very interesting facts. By the hand method it was necessary for the attendant to watch the paper very closely as it passed through the machine, in order to be ready to lift the pens and set them down exactly under the head lines. This constant eye-service was injurious to the optics of the employees, especially if they attempted to quicken the labor. The usual quantity of work turned out per diem, with a single machine, under the hand method, was *ten reams* of sheets. The same machine, with Edwards' improvement attached, turns out *twenty-five reams* in the same time, without any increase of expense. On what are known as "double machines" the improvement enables the operator to turn out *fifty reams* daily, or about *five times* the issue under the old plan. The estimated quantity of paper daily ruled in this country with head lines, is 10,000 reams.

Notwithstanding the great advantages which attend the use of Mr. Edwards' improvement, it appeared in evidence that he met with great difficulty in the introduction of his invention. The journeymen paper-rulers regarded the improvement as a high-handed innovation upon their rights, as calculated to take the bread from the mouths of their children, &c. In some shops the workmen combined against the introduction of the invention, and occasioned much difficulty to the patentee. But time, and the gradual return of common sense, have put an end to all those troubles. The invention is rapidly coming into general use, and there is some prospect that the efforts of the inventor to benefit the trade and the public will be appreciated. The improvement is a valuable one, and the inventor justly deserves a rich reward.

THE EXPENSE OF GAS IN CITIES.—The *North American* concludes an article on the "Cost of Gas," with the following remarks:—It will strike every one that the cost of gas in this country is disproportionately large as compared with British cities. It is proved in the calculations submitted to a meeting at Glasgow, that if no interest is paid on capital wasted in the crudities of first construction of works, gas may be furnished at less than fifty cents per 1,000 feet. All the great works constructed there, as well as here, are thus encumbered with unprofitably spent capital, which must be earned by the current use of gas, unless old works are wholly abandoned, and a strong point against the purchase by that city of the company works at Glasgow is made on the ground that the public are entitled to the earliest possible release from burdens unwisely incurred, and that such burdens should not be made a perpetual charge for the future. We here pay nearly double the highest price paid for gas, as the following comparison will show:—

Philadelphia,	per 1,000 cubic feet.....	$2 25
New York,	"	2 50
London,	"	97
Paris,	"	1 29
Manchester,	"	1 09
Glasgow,	"	1 21
Liverpool,	"	91

It is obvious that we might improve the condition of our gas supply, and reduce the very heavy bills our large cities pay for it, without devising any new gas to burn; but if any means whatever can be employed to light us at half the rates we now pay for this indispensable necessity, let us have light upon it, and have light cheap.

A STEEL STEAMBOAT.—A small steamer has been built in England of steel plates one-eighth of an inch in thickness. She is 70 feet long, 12 feet broad and 6½ feet deep, and measures 20 tuns. She has proved to be an admirable sea boat.

STEAMER "NEW WORLD" SUNK.

This splendid North river steamboat was sunk on the evening of the 26th ult., a few miles above this city, while on her passage to Albany. The cause of the accident was peculiar. A schooner having been observed in the path of the steamboat, the signal was given to stop the engines, when the engineer at once shut off the steam and unhooked the valve rods. By this sudden stoppage of the steam power, the crank shaft was broken, the walking-beam (weighing 10 tuns) was thrown forward about 10 feet, and the whole gallows-frame came crushing down upon the deck. Some of the machinery went down through the bottom, and the water rushing in, soon filled the cabins. All the passengers, we are happy to state, were rescued by boats which were in the vicinity. It was found that the gallows-frame which supported the beam was perfectly rotten—it could be crushed between the fingers like punk; and the wonder is that such an accident did not take place at an earlier date. This will lead to the gallows-frame of our steamboats being built of iron instead of timber; it does not rot, and is therefore more reliable than wood for all such purposes.

MANN'S STEAM PLOW.—O respondent from the New York State Fair at Albany, in his letter on page 257 of the present volume, stated that Fawkes' steam plow was on exhibition. Mr. Chas. F. Mann, of Troy, N. Y., informs us that his steam plow was the only one at the State Fair. We have not been informed regarding the performance of Mr. Mann's plow, or we should have taken pleasure in presenting the information to our readers.

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